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Table of Contents

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	Page.		Page.
SECTION OF PÆDIATRICS	751	MEDICAL SOCIETIES—	
SECTION OF PATHOLOGY, BACTERIOLOGY AND EXPERIMENTAL MEDICINE	759	The Medical Eye Service of Victoria	810
SECTION OF PUBLIC HEALTH, PREVENTIVE MEDICINE AND TROPICAL HYGIENE	763	CORRESPONDENCE—	
SECTION OF RADIOLOGY AND ELECTRICAL THERAPY	772	Impressions of a Ship's Surgeon, 1848	810
SECTION OF NEUROLOGY AND PSYCHIATRY	773	Malaria and its Treatment by the General Practitioner	811
SECTION OF ORTHOPÆDIC SURGERY	786	OBITUARY—	
SECTION OF DERMATOLOGY	796	Rudolph Herbert Schlink	811
SECTION OF MEDICAL LITERATURE AND HISTORY	800	CONGRESS NOTES—	
THE TRADE EXHIBITION	804	Australasian Medical Congress (British Medical Association)	811
BRITISH MEDICAL ASSOCIATION NEWS—		CORRIGENDUM	811
Scholarships and Grants	809	PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—	
Nominations and Elections	809	Queensland	812
British Medical Agency of New South Wales Limited	810	BOOKS RECEIVED	812
Medical Finance Limited	810	DIARY FOR THE MONTH	812
		MEDICAL APPOINTMENTS VACANT, ETC.	812
		MEDICAL APPOINTMENTS: IMPORTANT NOTICE	812
		EDITORIAL NOTICES	812

Section of Pædiatrics.¹

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Secretary: D. G. McKay, M.B., B.S., F.R.C.S. (Edin.), F.R.A.C.S., South Australia.

President's Address.

DR. H. DOUGLAS STEPHENS (Melbourne) chose as the subject of his presidential address "Acute Abdominal Conditions in Infancy and Childhood". He said that the task of deciding whether a child who had developed acute abdominal symptoms should be classed as a medical or surgical case was a serious responsibility. Except perhaps in the case of an intussusception, an immediate decision was often impossible at the first examination. Abdominal pain and vomiting were the two major symptoms. Some conception of the psychological make-up of the child was desirable, because the child of the too-sensitive, nervous type was apt to exaggerate his symptoms as well as his signs.

¹ The meetings of the Section of Pædiatrics with the Section of Dermatology, with the Section of Orthopædic Surgery and with the Section of Public Health, Preventive Medicine and Tropical Hygiene have already been recorded.

A methodical approach was advisable in all cases. The clinician should endeavour to ascertain whether the symptoms arose (a) within the abdomen itself or (b) in some other part of the body. If extraabdominal causes could be excluded, then careful sifting of the various intraabdominal conditions should be carried out. First the extraabdominal causes should be considered because they were relatively very few and were chiefly medical.

The chest was the most frequent extraabdominal cause of the pain and included such diseases as acute pneumonia, pleurisy and pericarditis. The throat should always be examined because of the frequency with which abdominal pain was associated with acute tonsillitis. Influenza of the so-called gastric type, acute catarrhal jaundice and tuberculous meningitis in the early stages might sometimes mimic an abdominal catastrophe.

It was convenient to include in this group acute pyelitis and the possibility of hydronephrosis with kinking

of the ureter or a kidney stone. Although psoas abscess was rarely the cause of acute abdominal pain, such an occurrence was possible, and in rare cases acute osteomyelitis of the spine, ilium and hip had caused confusion. Acute poliomyelitis of the abdominal muscles and *herpes zoster* before the vesicles appeared might simulate an intraabdominal lesion. Hysteria as a cause of abdominal pain in older children had to be included in this group, but was rare.

Excluding the results of trauma and hæmorrhage, the acute intraabdominal diseases were classified under three headings, which, though not strictly scientific, had the merit of inculcating method in examination. The question should be asked whether the features were consistent (i) with simple irritation or inflammation of the mucous membrane of the alimentary canal, (ii) with peritoneal inflammation, or (iii) with obstruction of the bowel. Cases coming into the first group were generally treated by medical means alone; the second group might occasionally be treated medically, but more often required the aid of the surgeon, whilst those in the third group were almost entirely surgical.

In childhood, ulcers of the stomach and duodenum and malignant disease might be excluded on account of their rarity. Gall-stones and cholecystitis were very uncommon.

In the first group, colic due to acute indigestion or gastro-enteritis might occasionally simulate an acute surgical abdominal condition. In these the relief induced by vomiting or the passage of flatus or fæces, and the fact that colicky pain invited pressure, served in some degree to differentiate them from the more serious peritoneal inflammations. In such cases, however, the patients required careful watching.

The prolonged use of arsenic in chorea and the ingestion of lead through the agency of paint had been the cause of puzzling colicky pain, sometimes severe. Worms also, especially if located in the appendix, were, in the opinion of Dr. Stephens, a frequent source of colicky pain from time to time. These attacks of what appeared to be appendicular colic sooner or later led to acute appendicitis. "Umbilical colic" from food allergens or associated with epilepsy in some obscure way was not infrequent. Chronic constipation was often the cause of mild abdominal pain, but when aggravated by purgatives might sometimes resemble an "acute abdomen". Typhoid fever on several occasions had closely mimicked an acute appendicitis. Enterospasm occurring in diabetes might be severe, and emphasized the necessity of examining the urine in all cases of abdominal pain. The examination should include tests for albumin, blood, pus and sugar, and a microscopic examination should also be made.

Some cases in which vomiting was predominant and in which pain was absent or mild came into this group. Classified as bilious attacks, cyclical vomiting or acidosis, they called for the greatest care in differentiating them from the vomiting of appendicitis or intestinal obstruction, especially in infants.

The second group embraced acute inflammatory conditions of the peritoneum. Statistics kindly compiled by Dr. Hutchings and Dr. Mackie, of the Children's Hospital, Melbourne, showed that in the last five years there had been 1,002 acute abdominal emergencies, and of these 769, or 76.5%, had been acute appendicitis cases. Dr. Stephens emphasized the necessity for early diagnosis in appendicitis, as the mortality was low in typical cases, whereas in obscure types delay increased enormously the operative risks. The elicitation of tenderness and slight muscle spasm were of greatest importance. Atypical cases were seen especially in retrocolic and pelvic types, and occasionally in the highly placed appendix, under the liver. Examination *per rectum* should be carried out in obscure cases. Primary peritonitis, embracing pneumococcal, streptococcal and staphylococcal types, was the next most common acute inflammation in the abdomen. Of thirteen patients with acute pneumococcal peritonitis all were females except one, and five died. Acute ileo-caecal adenitis often so closely simulated appendicitis that differentiation was impossible. Many such patients were tuberculous.

In the third group, easily the commonest acquired intestinal obstruction was intussusception. In the Children's Hospital, Melbourne, there had been 144 cases in five years, 82% occurring under one year of age, and 70% of the patients were males. The next most frequent form of obstruction was that arising from adhesions or bands, acquired or congenital. Most of these followed operations for appendicitis with peritonitis. In eight instances Meckel's diverticulum was the obstructing factor. Actually thirteen cases of this congenital anomaly had been encountered.

Volvulus due to malformation of the mesentery accounted for six cases, five patients dying under fourteen weeks of age. Only two patients with strangulated hernia were operated upon during the five years; but many obstructions were relieved and the patients were operated upon later. Of the other rarities inducing obstruction, duodenal stenosis and atresia, absence or stenosis of parts of the small bowel, microcolon, Hirschsprung's disease, twisted ovarian cyst and hydronephrosis embraced those of most importance and interest.

Dr. HENRY GILBERT (Adelaide) referred to the spontaneous reduction of intussusception, and recounted the clinical details of a case of a baby with the classical signs of intussusception who, after the introduction of a glycerine suppository, had expelled a motion of the "apple jelly" type and showed no further symptoms. Dr. Gilbert asked Dr. Stephens to indicate the opinion he held on this matter and to say what his clinical experiences had been in connexion with it.

Dr. P. L. HIPSEY (Sydney) said that there was no doubt that acute appendicitis easily headed the list of causes of acute abdominal pain in children, but the pelvic appendix was most frequently missed. He attributed this fact to the absence of abdominal tenderness. He had at least three times in the past two years seen a child with a ruptured pelvic appendix with abscess formation, the diagnosis of whose condition had been missed because a rectal examination was not made. The most frequent cause of acute abdominal pain in infants was intussusception, and the diagnosis was not often missed; but in the ileo-colic type blood might not appear for twelve to eighteen hours or even longer. One senior colleague had watched a patient with this condition for three days before the cause was recognized, and only recently Dr. Hipsley had encountered a case in which the diagnosis was missed for four and half days. Pneumococcal peritonitis might be due to a ruptured appendix. A patient with an appendiceal abscess had been treated by drainage and the wound had healed, but six months later, at a second operation, the appendix was found to be in two segments, and there was no doubt that it had been the cause of the pneumococcal appendicitis. At the original operation the organism was cultured and proved to be a pneumococcus.

Volvulus of the mid-gut from malrotation was commoner than was indicated in text-books. It might be only after three days of acute abdominal pain and vomiting that the presence of obstruction was recognized. Ulceration at the base of a Meckel's diverticulum, similar to peptic ulceration, could cause acute abdominal pain accompanied by hæmorrhage from the bowel. Dr. Hipsley added another rare cause of abdominal pain. A three-year-old child with acute abdominal pain had a thickening of the ileo-caecal region and a little blood appeared *per rectum*, and at operation ulceration of Peyer's patches was found; the ulceration was due to lymphosarcoma of the bowel and was accompanied by other manifestations of this condition.

Dr. F. LE MEURIER (Adelaide) commented on the difficulty in diagnosis of appendicitis in the young infant, and mentioned a case in which the diagnosis was made somewhat tardily, and he had allowed three months to elapse without operation; but the child had at that stage developed a fresh attack of pain and at operation the appendix was removed with satisfactory results. He asked Dr. Stephens whether he could give any information to assist in the early diagnosis of this condition in young infants.

Dr. IAN WOOD (Melbourne) emphasized the value of radiography in the differential diagnosis between pneu-

monia and appendicitis in doubtful cases. It had been decided at the Children's Hospital, Melbourne, that if the patient was very ill and had pneumonic symptoms and abdominal pains, and was over the age of two years, the absence of a shadow in the chest excluded pneumonia; if the patient was under two years of age it was not safe to rely on the absence of a shadow in the chest, as these patients sometimes developed definite evidence of bronchopneumonia subsequently. He also referred to the difficult problem of abdominal influenza, and stated that last year Dr. Burnet had investigated a number of these cases in his desire to obtain the virus of influenza. It had been established in these cases that the condition was not due to the specific virus, and it seemed probable that true influenza occurred very infrequently in comparison with the frequency with which the diagnosis was made. The bacteriological problem of true influenza had to be regarded as incompletely solved.

Dr. Wood added two other causes of abdominal pain to those which had been mentioned by previous speakers. His father, the late Dr. A. Jeffreys Wood, had had two or three interesting cases of *diastasis recti* associated with acute supraumbilical pain which accompanied exercise and brought about the collapse of the patient before the pain passed off. One of these patients secured relief by wearing an abdominal support and had been refused operation repeatedly by Dr. Upjohn; as the patient grew older, the attacks had ceased. The other type was the child with abdominal pain, drowsiness and severe headache, who tended to form the picture of migraine and who was cured only when supplied with glasses to correct refraction. The lesson which his father had drawn from these uncommon causes of abdominal pain was the necessity not to concentrate the attention on abdominal causes to the exclusion of the rest of the body.

Dr. H. BOYD GRAHAM asked Dr. Stephens whether he had associated navel colic with the early manifestations of rheumatic infection as a cause of abdominal pain.

Dr. M. F. WILLIAMS (Perth) referred to the association between acute upper respiratory infections and abdominal pain, and stated that either group of symptoms might be presented first, but that the removal of the focus of infection in the upper respiratory passages resulted in the cure of the abdominal pain.

Dr. DOUGLAS STEPHENS, in reply to Dr. Gilbert, said that in the collection of the group of 144 cases of intussusception in the past five years at the Children's Hospital, Melbourne, he remembered the exclusion of one which fitted Dr. Gilbert's description of spontaneous reduction exactly. Dr. Stephens added that he had seen two such cases in private practice, but had not seen a spontaneous expulsion of the gangrenous portion of the bowel which was still described in some text-books. Dr. Stephens referred to the 6.4% mortality rate that Dr. Hipsley had described in his paper, in 1935, as remarkably low, and stated that he had carried out Dr. Hipsley's method of reduction in three cases since. Each time he had opened the abdomen by a small incision to make sure that reduction had been completed and to discover the type of intussusception. The ileo-caecal variety was more readily reduced than the ileo-colic variety, and he thought that the non-operative method of reduction made it impossible to decide which cases were ileo-colic.

Dr. Stephens stated that he had not made a close comparative study of his analysis of cases with that at Great Ormond Street Hospital, but he had noticed that in the latter series the proportion of appendicitis was only 42% and intussusception 37% of the total, which was much smaller in the London group. This fact could be accounted for to a certain extent, as many of the patients with appendicitis were sent to general public hospitals; however, the number of cases of intussusception was not as great as in Melbourne.

He had been interested in Dr. Hipsley's remarks about pneumococcal peritonitis arising from acute appendicitis. He had not considered that possibility before, but he did think that pneumococci could puncture the wall of the small bowel and cause peritonitis. He had not omitted to mention in his paper the occurrence of peptic ulceration

at the base of a Meckel's diverticulum. Dr. Whitaker had reopened the abdomen of a patient upon whom he had operated for this condition, because of an immense amount of melena. Dr. Stephens thought that the profuse character of the melena led one to the diagnosis of this rare condition. He also stated that he had seen a case of lymphosarcoma of the bowel, but the abdominal pain had not been acute.

In reply to Dr. Le Messurier, Dr. Stephens said that he was unable at times to make the diagnosis of appendicitis in infancy with certainty. A child two or three months of age with acute abdominal pain and definite tenderness, who was very ill with vomiting, was operated on by him; the tongue and breath were normal, but the child was very thin and the father cadaveric. He had found a close sowing of miliary tuberculosis of the peritoneal wall of the bowel and the child had died three weeks later. He placed a great deal of reliance on the presence of tenderness in appendicitis of infants under one year of age, but said that it was necessary to approach the child quietly to establish the presence of tenderness. If a reasonable localization could be made, operation should be performed.

He agreed with Dr. Ian Wood that radiography was very valuable in the differential diagnosis of appendicitis and pneumonia, but it was necessary to have a good skiagram or expert radioscopy. The early shadow was obtained in lobar pneumonia, but not in bronchopneumonia. One never knew, however, whether the double-barrelled condition was present, and this possibility should be borne in mind. The abdominal pain associated with *diastasis recti* had interested Dr. Stephens, but he had not seen such cases. He had noticed the association between migraine and umbilical colic, and said that, later on, urticaria, asthma and migraine might all be present together. He did not think that umbilical colic was rheumatic, though he remembered that a Queensland surgeon had expressed the opinion that a great deal of appendicitis in children should be considered as a manifestation of rheumatic infection.

Dr. Williams had asked about the upper respiratory tract infections and abdominal pain. Dr. Stephens had pointed this association out at an early stage in his paper. Some fifteen years earlier he had had such a patient with particularly bad tonsils, and on removal of the tonsils he had been able to keep the patient under observation for ten years; no further suggestion of appendicitis had arisen. In America the association of these two groups was called Brennemann's disease, but Dr. Stephens thought that the syndrome was known long before Brennemann had described it.

Asthma in Children.

Dr. D. L. BARLOW (Adelaide) read a paper on asthma in children. He began by stating that considerable progress in the understanding of asthma and its treatment had been made in the past few years, and the immediate problem was to obtain a more general application of the available knowledge. It was important to have a correct diagnosis at the earliest possible stage; usually early attacks were atypical, but the examination of blood smears and nasal smears for eosinophilia would often settle any doubt.

Discussing aetiology, Dr. Barlow said that environmental factors were extremely important, and that whereas the influence of heredity had been fully recognized, more attention should be focused on such items as the bedding used by the individual, the furnishings of the home, and various materials in the dust of workshops or offices. To those working on allergy it was very apparent that repeated contact determined development of sensitization to some particular allergen. Multiple sensitization was usual, and house dust was a very common offender. The dust, dander and feather allergens were by far the commonest causes of asthma both in children and in adults.

Bacteria were sometimes a factor, either by keeping up a chronic bronchitic infection and thereby accentuating the effect of allergic sensitization, or by causing sensitization of the individual to bacterial products. Sensitization to common foods often occurred in asthmatic children, but was not often the chief factor. More frequently the attacks

were due to inhalant proteins, although ingestion of the offending foods might cause other symptoms. Pollens also played a part, but only a minor part compared with other inhalants. Nasal disorders in asthmatics were usually due to allergic irritation, and operations were inadvisable except for drainage of infected areas or removal of polyp. Radiographic appearances of sinuses affected by allergy were as a rule indistinguishable from those resulting from chronic infection, but with careful history-taking and examination for evidence of sensitization, mistakes could be avoided. Tuberculous infection was not common in asthmatic children in South Australia.

Investigation of the causative factors should be thoroughly undertaken as soon as the condition of asthma had been recognized, and should include not only tests for sensitiveness, but consideration of all other possible influences, such as environment in all its phases, with a view to their correction.

Prognosis was now distinctly good, providing the management was along the proper lines.

Dealing first with preventive treatment, Dr. Barlow said that a great deal could be done in this direction, especially in families possessing a tendency to become easily sensitized; but a general move in the right direction should be encouraged by informing the public of the value of reducing the inhalant allergens in the atmosphere of homes. This would also help to reduce the number of sufferers from so-called chronic nasal catarrh. Kapok and feather pillows (especially old ones with worn-out covers) were examples of things to be avoided; also the keeping of animal pets indoors.

In discussing therapy, Dr. Barlow said first of all that general management, including diet, and attention to psychological factors were important, but that he did not propose to discuss them in detail. An essential in all cases was the elimination as far as possible of offending allergens; and inoculation with suitable protein extracts with the object of desensitizing the patient was usually indicated. It was true that in some cases time and various therapeutic measures would clear up the attacks, but desensitization would hasten progress and place the child in a more secure position as far as liability to recurrence was concerned. In some cases vaccine therapy, by overcoming chronic bronchitis, was valuable in addition to desensitization.

The results of treatment as briefly outlined were excellent in almost every case in children and in the majority of adults, but for the achievement of full success it was necessary to have reliable and sufficiently potent extracts, and to employ them correctly. Much disappointment had resulted from the use of unsatisfactory extracts or from inadequate treatment.

Breathing exercises had always formed a part of Dr. Barlow's treatment; and they helped to promote general health and to reduce liability to asthmatic attacks. Ultra-violet light therapy was useful in places where sunlight was scarce. The clinical teaching of medical students in allergic disorders and their investigation should be improved, for there were many sufferers from such disturbances who were still in ignorance of the fact that they could be relieved.

DR. IVAN MAXWELL (Melbourne) said that it was of great interest to him to realize that, though they had not had the opportunity of comparing notes for a number of years, Dr. Barlow and he had come to almost identical conclusions on the main problems of asthma. Though Dr. Maxwell had seen thousands of the subjects of asthma since he had become specially interested, he thought it would be of value to the meeting if he supplied data from the analyses of the histories of the last hundred patients under the age of fifteen years seen by him in private practice. He showed a table of results of intradermal tests in these cases, in which 91% showed cutaneous reactions; 44% had reacted to grass pollens; 8% to capeweed pollen; 70% to house dust; 41% to feathers; 34% to kapok; 24% to foods, and 35% to miscellaneous substances. Intradermal tests had been replaced by scratch tests only in those cases in which there was a special indication that the patient might be extremely sensitive to the allergen. If the scratch test did not give a positive response, the intradermal test had

been used to confirm or disprove the negative result to the scratch test. Such a high percentage of reactions was obtained only by using very potent antigenic solutions and by judicious selection of the most likely causative agent based on careful history-taking. The table revealed that multi-sensitization was the rule. Among the 91 positive reactors, 256 reactions had been obtained. Even then the reactions to grass pollens had been grouped together. Dr. Maxwell then discussed the treatment in the following groups.

His first group was the pollen-sensitive group. He said that desensitization by the well-known method of increasing dosage of pollen extract had usually been adopted. The injections were given not only pre-seasonally in the winter, at an interval of three or four days, but also in the spring, summer and autumn, at the longer interval of three or four weeks. One or two minims of 1 in 1,000 solution of adrenaline had been added to each injection of extract to enable more rapid progress in desensitization. An attempt has been made in the cases of the older children to reach a maximum dose of 50,000 or 100,000 units of pollen extract; thus he was following the suggestions of John Freeman, of London, and Grafton Tyler Brown, of America. Dr. Maxwell considered that it was more important to desensitize those patients sensitive to grass pollens than those who reacted to capeweed pollen. The ubiquitous nature of grass pollen was due to the lightness and smoothness of the pollen, and to the fact that it was easily carried by the wind for many miles. It caused much more asthma than capeweed, which had heavy pollen of a sticky nature with spicules on its surface, and the capeweed pollen was not so readily disseminated by the wind.

The second group included those sensitive to house dust. Dr. Maxwell attributed the relatively unsatisfactory results of desensitizing injections to the fact that the exact chemical constitution of the irritant in house dust had not been identified; but the lines of treatment upon which he relied were that the patient should sleep out of doors, avoid dusty rooms or dusty occupations, and in many instances he had found that zinc ionization treatment of the nose had resulted in lessening of the asthma.

The third group included those sensitive to feathers and kapok. Dr. Maxwell remarked that these substances were usually found in the house as constituents of pillows, stuffing of furniture or in mattresses, and that the simplest method was to exclude them from the house. Satisfactory bedding substitutes were rubber pillows and mattresses, but wool pillows and mattresses could be used if they had impervious covers. Comparatively few patients were sensitive to wool, and for those who were the use of rubber bedding and thin rubber sheeting as covers for the blankets was essential.

The fourth group included those sensitive to foods. Desensitization, Dr. Maxwell stated, might be effected by the addition of minute but increasing amounts of the offending food to the diet, or the offending food might be excluded from the menu. The elimination diet such as had been suggested by Rowe might be useful not only in diagnosis, but also in treatment. Dr. Maxwell added that desensitization by injection of extracts of the food was seldom necessary.

The fifth was a miscellaneous group. Dr. Maxwell said that the animal antigens, orris root and other irritants in this group could in most instances be removed from the environment of the patient.

The sixth group was the bacterial group. Dr. Maxwell said that nine children who had not reacted to the intradermal tests were examples of those who suffered from infections of the nasal sinuses and tonsils, and some of these had required antral lavage and tonsillectomy. The infective factor was present as an accompaniment of the allergic condition in several of the 91 children who had shown skin reactions, but in most instances the infection had occurred in cedematous mucous membrane with poor resistance to bacterial invasion. The allergic factor should always be treated thoroughly before surgical measures were adopted, with the possible exception of tonsillectomy for grossly infected tonsils. Dr. Maxwell said that other therapeutic measures that he had found necessary

included the administration of drugs, the chief of which were adrenaline, ephedrine, the iodides and aspirin. For older children a spray containing 10% adrenaline might be very efficacious. He felt that with improved technique in diagnosis and more rational therapy the control of asthma in children had been most satisfactory.

DR. CHARLES SUTHERLAND (Melbourne) said that he agreed almost entirely with the views expressed by Dr. Barlow, and he proposed only to supplement the paper in his contribution. He had carried out either the von Pirquet or the Mantoux test in practically all of his cases, and had been struck by the rarity of positive reactions. He had not made a special investigation of the facts, but he had formed the impression that not more than 10% or 15% of patients had reacted. He preferred the von Pirquet test because with the Mantoux test hypersensitivity was liable to result in a brisk attack of asthma, especially with adult patients. He was particularly interested in Dr. Barlow's views regarding acquired sensitiveness, and he had been constantly coming across new cases which strengthened the view that persons acquired sensitiveness to substances to which they were constantly exposed. As instances he mentioned that the population along the Murray River showed an unusually high incidence of hypersensitivity to Murray pine pollen, and that pharmacists frequently acquired sensitiveness to ipecacuanha and to other dusts to which they were exposed. The Jewish population in New York were said to have a preference for pillows containing about 20% of rabbit fur, and allergists had reported a high incidence of rabbit fur sensitiveness among these people. Dr. Sutherland observed that if hypersensitivity really was acquired, the public would have to be educated to minimize the exposure to dust. Perhaps the simplicity and relative emptiness of some modern homes were an instinctive step in that direction, but there was ample opportunity for further improvement. He believed that more attention would have to be paid to the composition of bedding, and that large carpets should give way to polished floors and rugs, which could readily be taken out of doors for beating. He added that furniture should be simpler, and that bedrooms and other rooms should be as empty as possible. Dr. Sutherland considered that dietetic directions were of extreme importance in the control of asthma in children. It had often seemed to him that balance was of more importance than idiosyncrasy, although hypersensitivity to certain foods seemed much more important in children than in adults. It had surprised him to note how rapidly most children improved if one insisted on simple well-balanced diet, containing only the essentials, and eliminating complicated and indigestible things, such as sausages, cakes, sweets and cheese. Many of these children were very intolerant of any excess of starch, and in particular it was wise to forbid biscuits completely. Dr. Sutherland had noticed that infants with severe asthma usually had pronounced acidosis, and he had often found that calomel and liberal fluids would cause the attack to disappear promptly. He favoured the exclusive use of pure strained orange juice for twenty-four hours if the infant was not hypersensitive to it, and until the acidosis was dealt with he had found that adrenaline was comparatively ineffective. It had become more and more obvious to him that asthma was a general medical problem, although he thought that allergic factors had to be recognized clearly and dealt with adequately if treatment was to be successful. In every case allergic factors, diet, environment, psychology and perhaps sepsis had to be scrutinized carefully. It was ridiculous to pin one's faith to only one of these aspects; this generally led to poor results. Breathing exercises seemed to be of great use, especially when defects in posture were liable to develop in the absence of constant supervision. Brilliant results sometimes followed when a child was taught to breathe properly, but it was exceptional to obtain such results without coincident attention to all the other lines of attack. Dr. Sutherland emphasized the importance of reliable reagents and adequate dosage in skin testing and desensitization, and deprecated the use of poor reagents and poor technique, which frequently brought the treatment into disfavour through failure to obtain satisfactory results. He also

pointed out that treatment by desensitization should not stop as soon as the attacks disappeared, but should be continued for some months if fairly permanent results were to be obtained. He aimed at reaching the injection of 15 cubic centimetres of the strongest extract before cessation of treatment. He concluded by saying that the outlook in asthma of children was distinctly cheerful, and a good result would be obtained in almost every case if the available weapons were used effectively.

DR. A. W. SHUGG (Hobart) drew attention to the need for further investigation of the factors of heredity and climatic conditions in the aetiology of asthma. He had come across three children in one family with allergic manifestations. One was subject to hay fever, one to urticaria and the other to asthma. On the male side there were many instances in the family of sufferers from hay fever or asthma. The asthmatic child was extremely sensitive to rabbit fur, and contact with rabbits always produced asthma. With the older child the same hypersensitivity to rabbit fur did not cause asthma, but some other allergic manifestation. With reference to the climatic factor, Dr. Shugg said that in Hobart there was a wretched sea breeze every summer afternoon. In one direction the breeze came over land and sea, but in another direction it came over the ocean only. In each case the mothers knew of the risk of asthma, and a general exodus from the beaches occurred as soon as the breeze got up. It was admitted that the amount of sunshine in southern Tasmania was definitely less than elsewhere in Australia, and Dr. Shugg had satisfied himself that children there did not get optimal recovery without the assistance of ultra-violet ray therapy. He would like to hear what Dr. Barlow had to say about the influence of sea breezes in producing asthma, and of sunshine or ultra-violet light in curing it.

DR. LINDSAY MALE (Perth) said that the ground had been well covered, but he would like to direct attention to four important factors: (i) the toxic factor, (ii) the septic focus, (iii) the irritable nervous system, (iv) the allergic factor. Attention should be paid to all of these rather than to any one of them. Prolonged desensitization had been fairly satisfactory for the inhalant group in his hands, though he had noted that the skin reactions might not be altered when the asthmatic attacks no longer occurred. He was in agreement with previous speakers concerning the question of operative interference with the nose and throat, and preferred to establish satisfactorily the diet, bowel condition and environment of the patient before dealing with septic foci in the nose or throat. He was not fond of the use of aperient preparations with a paraffin content, and considered that much juvenile dyspepsia was associated with absorption of toxins. A feeding difficulty or food indiscretion leading to a breakdown in early infancy had occurred so frequently in the histories of children with asthma, that he had wondered whether they had any bearing on aetiology. A knowledge of this disturbance of nutrition in early life was helpful later in building up an anti-asthmatic diet. He preferred to use an elimination diet, and later to add eggs and other articles, and mentioned particularly the addition of soured-milk cheese. A rhubarb and soda mixture was frequently advised, and at times he had adopted extensive colonic lavage. Considerable improvement was usually manifested in a few weeks, and later septic foci could be cleared up. Dr. Male expressed the opinion that respiratory exercises were of inestimable advantage in the management of asthma in children.

DR. F. H. LE MESSURIER (Adelaide) also agreed in general with the comments of the other speakers, but he asked for information concerning the work of Bray, who had published his views on the value of the addition of hydrochloric acid therapeutically. Bray had adopted this practice because of his finding that in 85% of cases tests on the gastric contents had revealed a state of hypochlorhydria. Bray had pointed out to Dr. Le Messurier that asthmatic attacks were liable to occur on the night in the week in which the children had hot baths and opening medicine. He had allowed Dr. Le Messurier to confirm this fact by interrogating a number of unselected parents.

DR. MILTON COUTTS (Sydney) summarized the modern conception of asthma and mentioned, among others, the psychic and emotional factors. He stated that the multiplicity of the accredited causes of asthma still left doubt as to the real cause. He advocated in treatment the use of adrenaline to supplement the depleted supply, and morphine in acute asthma to depress the vagus and the higher centres. He said that nasal infection should be eradicated and that cauterization of the nasal mucosa and zinc ionization reduced the nasal obstruction and probably depressed the naso-pulmonary reflex. He considered that the swelling of the antral mucosa, as well as that of the bronchial mucosa, was the result and not the cause of asthma. Bronchoscopic lavage might afford considerable relief or temporary cure in chronic cases. Though the treatment was apt to be somewhat depressing, as much as 300 cubic centimetres of sticky gelatinous secretion might be sucked and coughed up, with considerable relief to the breathing and with abatement of the asthma. In sympathetically unstable people a closely guarded secret might be the emotional factor which was the exciting factor in the asthmatic state. Such an emotional factor should be sought for and dispelled before other treatment could be entirely successful.

DR. EDGAR STEPHEN (Sydney) referred to the benefit to the patient resulting from the improvement in the parent which occurred during the treatment of the child. He illustrated the point by describing the case of a boy whose repressed behaviour was supported by a history of poor appetite and attacks of asthma. Under the influence of hospital regimen the boy's appetite had improved wonderfully; asthma had not been evidenced and the exuberance of spirits with return of health and happiness had soon justified his discharge from hospital. At a subsequent consultation Dr. Stephen had found that the fond parent urged the boy to be much more decorous, but the asthma had returned. He considered that the parents of asthmatic children were not only loving, but too loving, and checked the children too much.

DR. BARLOW, in reply to the discussion, was glad to find himself in agreement with the remarks that Dr. Maxwell and Dr. Sutherland had made, which supplemented the views expressed in his paper. He had not had time to refer to the details of dietary. With Dr. Shugg, he was puzzled as to the exact meaning of the aetiological factor involved in heredity. He had studied the problem carefully for at least ten or fifteen years, but had not been able to solve it. He agreed that ultra-violet light was beneficial when natural sunlight was not plentiful and regarded the climatic factor as important. There was something about sea air, perhaps the moisture or the salt content, which affected asthmatics adversely. It was not just a question of the presence of allergens. Quite a number of patients were affected unfavourably by going to sea, especially if the air was cold or windy. Like Dr. Maxwell, it was his practice to use a mixture of grasses, and not individual grasses, and to employ greater strengths than were supplied by the Commonwealth Serum Laboratories. He had made his own preparations for many years. He, too, used adrenaline in a bigger dose than was usually advised and considered that in a severe attack it was not a good thing just to get a sense of relief for the patient. As a sufferer from the complaint who was able to auscultate his own chest with a stethoscope, Dr. Barlow had found that though relief was obtained the chest was still full of squeaks and the movement very limited. He supplemented the initial dose of adrenaline with other injections until complete relief had been obtained. Dr. Male had not expressed any radical difference in outlook; toxins from the digestive tract were among the general things which had not been discussed by Dr. Barlow. He agreed that the skin reactions were not always abolished with desensitization, but had found them to be greatly reduced and considered that he could trace the effect of treatment by means of the alteration in the degree of skin reaction obtained from time to time. The behaviour of the skin test supported the view that desensitization treatment should be a lengthy procedure.

In reply to Dr. Le Messurier, Dr. Barlow said that he had given hydrochloric acid to quite a number of his patients with benefit, though possibly he had not used it sufficiently. He had not formed any firm opinion as to the influence of the hot bath, but it might act as a "trigger". He agreed with Dr. Milton Coutts and with Dr. Edgar Stephen that the psychic factor was of importance. Emotionality and coddling did a lot of harm. Fright caused an outpouring of the adrenaline and did not seem to improve matters, though Dr. Barlow had noted that personally he had not had a severe attack of asthma during the war in the firing line or in positions of danger, but had been affected when in billets out of the line.

Raw Apple Diet and Diarrhoea of Children.

DR. P. A. EARNSHAW (Brisbane) read a paper on raw apple diet in the treatment of diarrhoea of children. He said that a decade had passed since Moro and Heisler introduced the raw apple diet in the treatment of alimentary disorders. During this time investigators throughout the world had tried the treatment and all had achieved similar results.

In his own practice he had used the following method of treatment. There was no initial treatment in the way of lavage, purgation or starvation. The patient was immediately given a diet of raw apples, one being taken every hour during the day and every two hours during the night. When the apples were specially large or small, one to four tablespoonfuls of the pulp were given every hour, or an average of about thirty tablespoonfuls a day. The apple was peeled and the core was removed. It was then rubbed on a fine grater to make as fine a pulp as possible. The pulp was reddish-brown in colour. No sugar was used, though saccharine might be added if desired. No other food or fluid, except water, weak tea or saline solution, was taken, and only enough of it was taken to slake the thirst. No medicine was used. If the patient was dehydrated, saline solution with or without glucose might be given subcutaneously. This method of administration of the raw apple diet, together with the subsequent transitional diet, was the same as that described by him in an earlier paper.

Dr. Earnshaw then referred to difficulties met with in the use of the raw apple diet. He said that the greatest difficulty in the treatment was in persuading the parents, sometimes the nurse and occasionally the practitioner in charge of the patient that the patient should and could be made to take the treatment. It was necessary to insist that the treatment be carried out to the letter, especially during the first three days. Dr. Earnshaw began by telling the parents that after the first three or four doses they were going to have very great trouble in making the patient take the apple, but he added with confidence that the child could be made to take it and had to take it. He now had no trouble on this score, probably because he spoke with greater confidence than in his earlier cases. If he had reason to believe that the child was going to be specially troublesome, then he insisted on a capable nurse being engaged or on having the child removed to hospital. The same directions that one would give the parents had, needless to say, to be given to the nurse.

Dr. Earnshaw then said that it was difficult for young children, especially nurslings, to take large amounts of grated apple. To overcome this difficulty he had approached Messrs. H. Jones and Company Proprietary, Limited, of Hobart, and had persuaded this firm to produce an apple powder called "Applo". This powder was made from desiccated apples. It was of a yellowish brown colour and generally caked hard. The hard mass was easily broken up and pulverized and mixed readily with warm water or weak tea. The temperature should not be more than 50° C. No sugar should be used, but saccharine might be added for sweetening. It might be taken warm or cold. It was more easily measured than the raw fruit and represented six times the same quantity by weight of fresh apples. The initial dose was usually a heaped teaspoonful or two level teaspoonfuls to four ounces of water. This amount might be increased or even doubled. It was

important to remember that it had to be prepared freshly each time.

Referring to the use of "Applo" in infantile diarrhoea, Dr. Earnshaw said that the apple powder was excellent for nurslings. He had used it for several children of three months of age and for two of five and six weeks of age respectively. There was the same difficulty in inducing the babies to take the powder, but he explained the difficulty to the parents beforehand as with the raw apple and generally speaking there was no trouble. After two or three feeds the babies took it quite readily.

Dr. Earnshaw described the manner of administration of "Applo". He said that latterly in treating babies he had carried out the following method in every case. First of all two level teaspoonfuls of the apple powder were mixed with an equal amount of cold boiled water to make a paste. The paste was then added to four ounces of hot weak tea (not warm or boiling) and stirred for ten minutes. A quarter-grain tablet of saccharine was added for sweetening purposes for infants over six months of age. This was given every hour during the day and every two hours during the night. After twenty-four hours he used hot boiled whey instead of hot weak tea.

On the third day he added the "Applo" paste to a hot four-ounce mixture of "Eledon" instead of the tea or whey and this was given every two hours during the day only. "Eledon" was a lactic-acid butter milk powder made by the Nestlé and Anglo-Swiss Condensed Milk Company. A level compressed measureful of "Eledon" was added to four ounces of water (a measure was supplied in the tin). On the fourth day he gave double the quantity of all ingredients every four hours. On the fifth day and onwards he gradually replaced the "Eledon" mixture by skimmed milk and then whole milk, and finally he reduced and did away with the apple powder.

In conclusion, Dr. Earnshaw said that it was safe to state that the use of the raw-apple diet or one of its substitutes marked a great advance in the treatment of diarrhoea in children. The treatment was safe even in unskilled hands. It was straightforward and practical, the directions being simple. It was inexpensive and should be within the reach of all parents. It could be depended upon to give relief which was always permanent. Lastly, the apple or its substitute, such as "Applo", should be available in any part of Australia, no matter how remote.

Dr. F. N. LE MESSURIER (Adelaide) said that at the Adelaide Children's Hospital he and all his colleagues had used this method of treatment with some measure of success. He had found it difficult to decide which child was suitable for it, and he was not keen on using it for very small babies. He had read several articles by Professor Schife, Berlin University, on water balance. By reducing the quantity of water given to animals he had been unable to reduce the intestinal intoxication until protein was excluded from the food of the animals. To get rid of the intoxication it became a question of cutting out the protein. Dr. Le Messurier had been rather pessimistic concerning intestinal intoxication in babies and had found the results gratifying on a reduced diet. He wondered whether the success of raw apple diet obtained by Dr. Earnshaw could be attributed to the removal or the reduction of protein its use involved. Professor Schife advised the use of Ringer's solution containing a little rice daily and glucose, and did not worry about the resulting motion. He persisted with this feeding for a number of days before introducing protein. Dr. Le Messurier had been worried about the question of giving protein to a sick type of child. Referring to intestinal intoxication, he said that he had used butter-flour-milk mixture in dysentery and had had success.

Dr. EDGAR STEPHEN (Sydney) stated that when he had visited Queensland he had found that Dr. Earnshaw was a man of enthusiasm, and he had been stimulated to try raw apple diet from that time. Dr. Stephen had used an apple diet fairly constantly, but not for the acutely toxic child who needed sodium sulphate. He had had an uneasy feeling that two ounces—two-hourly by day and four-hourly by night—would not be sufficient to satisfy the

baby; he had found, however, that the food value represented by this régime was 560 calories and it had proved sufficient as a rule. He had also wondered whether the babies would take the food, but the Royal Alexandra Hospital nursing staff had been able to give it to the babies satisfactorily. He continued its use for three days and the motions improved rapidly. As a side issue he had used grated apple for a patient with nephrosis who was a difficult feeder and the oedema had cleared up. At the same time the weather had changed and he was not sure that the use of the apple and the disappearance of oedema were related to each other, but he used similar feeding for the next patient with nephrosis who had had oedema for nine months and within two or three days the child was materially improved in respect of the oedema. He had gone on until the series had now reached five children, the most recent one still being in hospital. Dysentery in babies was a disappearing disease in Sydney owing to the welfare workers, and just as interest was being lost in the disease on that account a very ready cure had been forthcoming.

Dr. R. L. T. GRANT (Adelaide) said that he had been an enthusiast from the time he had read Dr. Earnshaw's original paper in THE MEDICAL JOURNAL OF AUSTRALIA. At first he had had to overcome the objections of the mothers to the diet, especially in private practice, but since "Applo" powder had been available he had not encountered this difficulty. When the patients were reluctant to take the diet he had found it of assistance to add pulp banana, especially for the older children. Dr. Grant could only call to mind one failure in his small personal series. The child had died in twelve hours, but had had acute ulceration of the large intestine and the lower end of the small intestine, resembling lesions of typhoid fever; the intestinal contents were not unpleasant and resembled chewed-up raw apple. He considered that the introduction of this diet for diarrhoea in infancy was one of the biggest advances that he had witnessed. In Adelaide, owing to the provision for babies at the welfare centres, diarrhoea disease was materially diminished in frequency. The apple treatment had become known to the laity in Adelaide through reference in the papers and he had come across a number of instances in which the children had been treated in this way before they saw the doctor.

Dr. M. COCKBURN (Adelaide) regarded the question with mixed feelings; he thought that the success that he had had with the treatment depended on the age of the patient. With patients under the age of nine months he had met with little success, but after nine months of age it had proved very satisfactory and in some cases had been absolutely dramatic. He remembered a baby, eighteen months of age, who had been ill for some weeks. This baby had had forty-four stools on the day before he was consulted; he had instituted the apple treatment and the baby had had only eight stools in the next twenty-four hours and two the next day, and was almost constipated by the fourth day. The single proportion pectin-agar mixtures had been described recently in the *American Journal of Diseases of Children*. He had tried them in two cases at the Mareeba Baby Hospital, but they had not proved a satisfactory substitute for apple diet.

Dr. LINDSAY MALE (Perth) said that in Western Australia he and his colleagues were enthusiastic with regard to the efficacy of apple treatment. Seven or eight years earlier he had used grated raw banana in post-dysenteric nephritis. They saw a number of cases of particularly virulent dysentery associated with acute toxic nephritis. Having used raw banana for two or three years in dysentery with good results, his enthusiasm had waned, and after a lapse he had heard of Dr. Earnshaw's raw apple diet and had used it frequently; the results had been extraordinarily good. He thought that in Western Australia they had adopted the habit of hurrying the treatment and packed the patient with raw apple rapidly. It was usual to get large apple stools laced round with blood and mucus. The stools were infrequent and seldom more numerous than two a day. On the third day of treatment

evaporated milk was introduced. With reference to apple powders, Dr. Male said that they had used Jones's "Applo" for one season, but he had not been altogether satisfied with the results. He then commenced to use the German preparation "Aplona", which was manufactured at Munich under the directions provided from the University of Heidelberg, and was satisfied to use this preparation for babies as young as seven months of age. They had found the large green apple known as "Granny Smith" to be particularly suitable when raw apple was required.

DR. EARNSHAW, in reply, told Dr. Le Messurier that he had been interested to hear about Professor Schife. Dr. Earnshaw regarded the proteins as an important factor in the diet for diarrhoea and was always careful to exclude protein in the early stages. He agreed with Dr. Cockburn that satisfactory results were more easily obtained in older children and informed him that a pectinagar mixture was obtainable under the name "Jellex" from the stores. He informed Dr. Edgar Stephen that he had now disposed of the preliminary use of sodium sulphate; he had been interested to hear of the use of apple diet with a low milk intake in the dietary of patients with nephrosis. The unpleasant taste of "Applo" could be overcome by drying the apples *in vacuo*, but the preparation would be much more expensive on account of the cost of installing the special machinery necessary. He had used banana as well as apple, and even a mixture of other fruits for children four or five years of age with satisfactory results.

The Unsatisfactory Child.

DR. G. LINDSAY MALE (Perth) read a paper entitled "The Unsatisfactory Child". At the outset he admitted that the definition of an unsatisfactory child was elastic. He based his remarks on the so-called nervous or difficult child as met in practice, or the child who, by reason of some psychological element, presented physical symptoms or suffered from vague ill-health. The unsatisfactory child thus presented a social as well as a medical problem, which, however, in the majority of instances, came within the venue of the medical man. Dr. Male referred to the importance of the sympathetic but firm handling of parents, enlisting their cooperation and passing some responsibility on to them. The effects of home influences were important. Among these was the mother complex. More frequently the child was an only child or was separated by some years from his brothers and sisters. These manifestations more often presented themselves among educated people.

National calamities had a part in producing nervous manifestations; such were the post-war period and the financial depression. Domestic stress was caused by these factors. Financial or marital influences were important, and child rebellion might be due to lack of cooperation between parents. Popular fads and fancies induced an unwholesome mental attitude, and there was a fashion of attributing all nervous disturbances to sex or sexual influences. This was fostered by publicity, the Press and the radio. Advertisements of proprietary preparations played a part. There was a tendency in the lay mind to over-estimate the value and place of psychology. There was also a tendency to blame the medical attendant for non-results, or to think that psychological treatment was all that was necessary. The parents tended to absolve themselves from all responsibility.

Common nervous manifestations were: temper tantrums, emotional disturbances, tears and night terrors, stealing and lying, enuresis, speech defects, backwardness, feeding difficulties, allergic disturbances.

A common aetiological factor in practically all cases was fatigue of the child. Contributing to the fatigue were: traffic noise, blare of wireless sets, the so-called bed-time stories of exciting nature, the cinema, unnecessary or excessive home lessons, lack of rest.

Dr. Male insisted that parental cooperation should be sought in all cases. Uniform handling was necessary;

and mental energy or activity should be directed by the cooperation of school teachers. The value of schools and kindergartens should be recognized.

Dr. Male referred to various popular interpretations of the nervous child. First there was the child of emotional instability and inheritance. Secondly there were children difficult to handle or badly managed, who had to cope with defective physical factors. Thirdly there were mentally subnormal children.

The last-mentioned group needed ordered treatment: (a) Septic foci in teeth, tonsils *et cetera* should be attended to. (b) Glandular preparations might be needed. (c) Elementary schooling with similarly affected children should be given. (d) Rhythm should be encouraged by dancing and music. (e) The advisability of admitting the child to a suitable institution might have to be considered.

Dr. Male drew attention to the purely medical aspect of the unsatisfactory child in that endocrine disturbances were frequent. Juvenile hyperthyroidism might be present, and contributing factors were domestic unrest and septic foci.

The neurogenic factor in asthma had to be considered. Erythredema to anorexia nervosa proper might be present; and the factors complicating treatment were: (a) an emotional disturbance in both parent and child, (b) the late institution of mixed feeding.

Acidosis frequently determined the onset of enuresis, masturbation, sleep disturbances, vomiting, irregular temperature—suggesting latent tuberculous infection. Contributing factors were emotional inheritance, undue parental solicitude and over-feeding with dairy products.

Dr. Male summed up the general treatment of the several groups mentioned under the following headings: (a) parental cooperation, (b) uniformity of handling, (c) regular domestic routine, (d) advisability of choosing a suitable school (boarding or kindergarten), (e) judicious eradication of septic foci after treatment had been satisfactorily instituted, (f) an endeavour to avoid excessive therapeutic measures and proprietary preparations in order to avoid a mental attitude of chronic invalidism.

DR. I. M. ALLEN (Wellington) said he was a neurologist who was frequently associated with a neighbouring colleague in the solution of problems. He considered that the word "nerves" so frequently used in the family was used to avoid facing the real truth. Cheap psychological literature should be suppressed. The unit of treatment had to be the child. He told the story of Joseph, whose mother over-mothered him as a compensation for the hard things she had thought about him during the early months of pregnancy. At eight years of age, after going among other children, he had had two fights in one month and had won one of them and lost the other without minding much. Dr. Allen considered that the treatment adopted was commencing to pay dividends. If a child of this age behaved in an emergency situation like a child of three years there was something wrong, but it should not be overlooked that behaviour which was not always pleasing to the adult mind might be well within the bounds of normality in the case of young children. Dr. Allen thought that the method of education on kindergarten principles was the only satisfactory one. Education consisted in the development of individual personality and the adjustment of the child to his surroundings; the ideal position was between these two extremes. Occasionally such conditions as congenital word-blindness, "number" difficulties, and slight defect of vision or hearing handicapped normal progress. Such conditions should be taken into account during investigation of behaviour problems; moreover, school medical inspections were at times performed somewhat perfunctorily and far too infrequently.

DR. MALE, in reply, gave an account of an alert child, six years of age, who had never taken anything more solid than jelly, and had always been literally spoon-fed by his mother. It had been necessary to kidnap him from his mother's care while she was ill with an attack of asthma before it was possible to bring him under the care of an aunt with two small healthy and happy boys, who, after a

short initial period, brought his conduct into line with theirs. He gained weight at the rate of a pound a day for a long time, and his progress had been entirely satisfactory.

At the invitation of the President, Dr. H. BOYD GRAHAM moved the following motion, which was seconded by Dr. LINDSAY MALE and carried without dissent:

That the Pædiatric Section of Congress recommend that every effort should be made by the Executive of the British Medical Association to further the application of the scientific facts of normal child development, mental and physical, for the benefit of pre-school children in all the States of the Commonwealth.

Section of Pathology, Bacteriology and Experimental Medicine.¹

President: Professor W. K. Inglis, M.D., Ch.M., New South Wales.

Vice-Presidents: Professor H. A. Woodruff, B.Sc., M.R.C.V.S. (Lond.), L.R.C.P. (Lond.), M.R.C.S. (Eng.), Victoria;

G. C. Taylor, M.B., Ch.M., Queensland; S. N. Michaels, M.B., B.S., D.P.H., R.C.P.S. (Eng.), Western Australia;

R. E. Richards, M.B., B.S., Tasmania; Professor J. B. Cleland, M.D., Ch.M., South Australia.

Joint Secretaries: A. E. Platt, M.B., B.S., D.T.M. & H., Dip.Bac. (Lond.), South Australia; F. Ray Hone, M.D., B.S., B.Sc., South Australia.

President's Address.

PROFESSOR KEITH INGLIS (Sydney), in his presidential address on "Newgrowth of the Breast, with Special Reference to Precancerous Conditions", laid stress on the bad prognosis once mammary cancer was clinically recognizable, no matter what form of treatment was adopted.

He emphasized the importance of studying precancerous conditions of the breast, and, while recognizing that the views of different authorities varied in this regard, he expressed the opinion that hyperplasia of duct epithelium, with or without the formation of cysts, was the most important of these precancerous conditions; especially was this true of the localized form of epithelial hyperplasia.

He stressed the importance of distinguishing between precancerous and cancerous changes, but pointed out the difficulty, and often the impossibility, of recognizing precancerous changes in the breast before carcinoma became clinically evident. He sounded a note of warning lest anxiety to eradicate the disease before cancer cells had broken through the walls of ducts and infiltrated the connective tissue should result in too great zeal in advising amputation of the breast.

DR. T. CHERRY (Melbourne) said that Professor Inglis had chosen his material in order to show the problems that cropped up in all situations, and especially in cancer of the breast. Forty-two years ago, with Professor Harry Allen, he (Dr. Cherry) had examined a series of tumours of the kidney, and these showed the same phenomenon as those of the breast; there were parts that were undoubtedly malignant, and places in which the process was just starting. Then shortly afterwards, in studying condylomata, he saw examples of irritated epithelium, in which the changes were very difficult to separate from malignant disease. The change from normal to malignant tissue must, Dr. Cherry thought, start with a very small departure from the normal; there would have to be some force to make it self-supporting, and then it could reproduce itself at a little distance. He spoke of the importance of the relations of lymphocytes to these conditions, and had many slides from mice which supported Handley's contention. The crude theories of origin of the last generation were gradually being replaced by knowledge put on a firmer basis.

DR. A. H. TEBBUTT (Sydney) said that until recently people had rather blamed histologists for failure to elucidate the problems of cancer. Cheate had gone a long way towards describing the histological developments of cancer of the breast. Pathologists could see in their slides the pathogenesis of cancer of the breast in its various forms. In cases of malignant disease of the breast he

had often found at the edge of the tissue evidence of a precancerous condition. The remainder of the solution of the problem of cancer of the breast remained with the experimentalist. Professor Muir and Professor Inglis had largely solved the histological problems of Paget's disease. In a recent case Dr. Tebbutt had found in different parts of the breast an area definitely malignant and an area of benign neoplasia. The same process was occurring throughout the breast, but more advanced in one place than another. The greatest bugbear was the fear of some surgeons that a local excision was damaging to the patient. Even the most skilled surgeons were sometimes unable to determine whether a tumour was or was not malignant. In these cases a part or all of the lump should be excised, and the subsequent action of the surgeon be based on the pathological opinion. Dr. Tebbutt preferred to use the paraffin technique, and he used immediate frozen sections only when the surgeon demanded them.

PROFESSOR H. A. WOODRUFF (Melbourne) quoted an interesting example from comparative pathology bearing on the aetiology of neoplasia. There had never been reported in the English literature a case of carcinoma of the udder, although the udder was freely exposed to traumatic and inflammatory influences.

DR. E. McLAUGHLIN (Adelaide) referred to a difficulty he had met with in the diagnosis of cancer of the breast by immediate frozen sections. The cases in which the surgeon was doubtful of the diagnosis from macroscopic examination of the tumour were often the cases which required the best technique in the preparation of the section and in which the frozen section might be found lacking.

Some Modern Phases of Laboratory Diagnosis.

PROFESSOR H. A. WOODRUFF (Melbourne) read a paper entitled "Some Modern Phases of Laboratory Diagnosis". He said that he proposed to discuss some of the laboratory problems arising as a result of the rapid advances in knowledge of microorganisms responsible for disease and of the immunity responses of the body. The laboratory envisaged was one concerned with the public health service and available to clinics, country hospitals and practitioners. The last ten years had witnessed an extraordinary change in method owing to growing knowledge of the antigenic structure of organisms and the complicated immunity reactions of the animal host. Illustrations could be provided from a few of the more common conditions for the diagnosis of which laboratory assistance was sought.

In the first place, the diphtheria problem was increasing in complexity rather than decreasing. From near-by clinical cases swabs received at the laboratory were sown on Löffler's blood serum and incubated for at least eighteen hours. Smears which were then microscopically "positive" justified a "positive" report. With cases at a

¹The meeting of the Section of Pathology, Bacteriology and Experimental Medicine with the Section of Public Health, Preventive Medicine and Tropical Hygiene has already been recorded.

distance so that swabs were delayed in transit blood serum tubes were sent so that the doctor could himself inoculate the medium to avoid desiccation. From children showing no symptoms a "positive" microscopic test was reported as "auspicious" and another swab was examined in three or four days' time. If the result was again "positive", a virulence test was carried out. The organism was isolated on a tellurite blood agar plate and from this culture a guinea-pig was inoculated. Death within four days with characteristic *post mortem* appearances indicated "virulence". Because of the occurrence of *gravis* strains of diphtheria in Victoria, McLeod's special tellurite medium was now employed in parallel with Löffler's blood serum in order to be able to type the causal organism, and if the *gravis* strain was detected the doctor was warned accordingly.

Professor Woodruff then discussed typhoid fever. He said that in place of the old microscopic Widal test a complicated series of macroscopic tests was now necessary, but first the importance of attempting culture of the typhoid bacillus from the blood during the first week had to be emphasized. The agglutination test now included tests against not only typhoid fever, but paratyphoid fever, undulant fever and *Proteus* X 19 in relation to typhus fever. Both H (flagellar) and O (somatic) agglutinins had to be tested for and the difficulty arising from the large number of vaccinated (anti-typhoid) persons had to be considered. The standardization of technique and reagents in conformity with the Oxford Standards Laboratory was today necessary and failure to conform would furnish results impossible of comparison with results in other laboratories. An attempt was now being made in Melbourne to determine what were the possible "levels" of agglutinating titres among healthy people against the typhoid bacillus.

Referring to undulant fever, Professor Woodruff said that if this condition was suspected an attempt should be made to secure a blood culture when the fever was at its height. Agglutination tests should also be made with a polyvalent bacterial suspension, the test being repeated two or three times to determine rise or fall.

Turning his attention to streptococcal infections, Professor Woodruff said that important advances in precise identification and classification of streptococci had been made in the last few years, notably by Lancefield, F. Griffith and Dora Colebrook. The hæmolytic streptococci producing hæmolysis could now be identified by cultural and agglutination tests, but much work required to be done in Australia to determine the frequency of the specific types responsible for puerperal fever *et cetera*. It was not enough merely to determine the presence of a hæmolytic streptococcus in a throat swab. Time and money were needed for this research, which was just as important as the typing of the pneumococcus.

The next condition discussed by Professor Woodruff was tuberculosis. He said that not every acid-fast organism in urine or in milk was a tubercle bacillus and care was necessary to see that containers for specimens sent to the laboratory were sterile and that specimens were collected with the necessary precautions. Tragic mistakes could otherwise be made.

In regard to syphilis, Professor Woodruff said that the Wassermann test needed no apology, but the particular technique used was important and the Harrison-Wyler method advised by the British Ministry of Health was to be recommended. Confirmatory tests were very desirable in many cases and the Kahn flocculation test was confidently advocated, whilst the Vernes photometric test had the tremendous advantage of being shown in graph form with numerical values for the degree of infection.

Professor Woodruff said that time forbade the multiplication of examples of the complexity of modern requirements in a public health laboratory. The diagnosis of typhus fever of various types; serological tests for gonococcal infections; the typing of the pneumococcus; the differentiation of "food-poisoning" organisms—salmonella, staphylococci, botulinus; all these deserved mention. Professor Woodruff's proposition was that the ambit of such a laboratory and the need for highly skilled technicians was

increasing every day. Such a laboratory was a "State" responsibility and it should be adequately financed. The interests of the public health demanded that laboratory facilities should be available both to public bodies, to health officials and to general medical practitioners, especially the last, because ultimately the most important guardians of the public health were the general practitioners. Further, no hindrance in the way of fees should lessen the use of such a laboratory. This was a matter on which bacteriologists and pathologists had to direct the members of the medical profession, by whom in turn State Governments and other health authorities should be informed.

Dr. RAY HONE (Adelaide) said that swabs were taken from all entrants to the Adelaide Children's Hospital to prevent the entrance of diphtheria carriers into the ward. In swabbing for diphtheria it was important to perform the swabbing properly and to be sure that the swabbing was from the tonsils or otherwise there would be misleading negative results. Dr. Hone had not used bile broth for blood cultures in an unknown fever, for the organism might not be the typhoid bacillus. At the Adelaide Hospital it was the rule to make a blood culture, serum agglutination test and a white cell count in all cases of suspected typhoid. Several cases of undulant fever had been diagnosed. The fewness of human cases was remarkable. On one station the cattle were heavily infected and yet there were no cases among the workers on that station.

Dr. D. L. BARLOW (Adelaide) said that he was aware that there were pitfalls in making a diagnosis of diphtheria from direct smears, but the method had two advantages. It might allow an immediate definite diagnosis to be made and it would detect a certain number of cases of Vincent's angina which might otherwise be overlooked.

Dr. A. E. PLATT (Adelaide) said that desiccation of swabs was a real problem. When the swabbing had to travel for twenty-four hours the percentage of positive results was less than he thought it should be. He had recently made two sets of swabs from a number of cases in the northern district. One set was sent in the ordinary way, taking thirty-six hours to arrive at the laboratory, and the results were largely negative. The other duplicate set was brought by motor car in eight hours and the results were all positive. It would be desirable to decentralize to some extent the diphtheria work. When a swab had to be sent from the country to the city the result was received too late to be of much help to the practitioner. It was necessary for Australian bacteriologists to work in conjunction with one another in agglutination tests for typhoid fever so that there would be established Australian standards as to the titre accepted as diagnostic. He had found agglutination for *Brucella abortus* in titre up to 1 in 1,250 in a series of sera sent in for the Wassermann test, and titres of 1 in 80 to 1 in 320 were reasonably common. These people gave no history of pyrexia.

Dr. G. TAYLOR (Brisbane) referred to the ever-increasing number of tests that pathologists were asked to do. He described a number of cases in which acid-fast bacilli were recovered from samples of urine. They were not pathogenic to guinea-pigs and were to be regarded as contaminants. This showed the great need of care in collecting samples of urine for examination for tubercle bacilli.

PROFESSOR WOODRUFF, in reply, stated that the chief problem in blood cultures was to decide how many media to employ. Dr. Butler had recommended four stock media for every culture. Professor Woodruff endeavoured to use two. Tryptic digest broth and bile broth were the two most useful. He had had satisfactory results in culturing tubercle bacilli. He had detected four cases of infection with *Brucella abortus*. Milk was not the common source of infection. Abattoir workers, veterinary surgeons and dairy farmers were those liable to become infected. He agreed with Professor Inglis that medical qualifications were necessary for the pathologist who came into contact with patients. In a public health laboratory, on the other hand, more use could be made of technicians.

The Tubercle Bacillus and Cancer of the Alimentary Tract.

DR. T. CHERRY (Melbourne) read a paper on the tubercle bacillus and cancer of the alimentary tract. He said that a survey of the work already done on the relation of cancer to the tubercle bacillus showed that the incidence of cancer was, in a broad way, conditioned by the incidence of tuberculosis. This fact came out clearly from the data published in England regarding the incidence of both diseases in the male population when classified by occupation and social class. In particular, cancer of the skin, lip, tongue, mouth, œsophagus and stomach was nearly twice as common among the poorer paid workmen as it was among professional men of corresponding ages.

When the site incidence of the malignant tumours was considered, it was found that special factors decided the organ and tissues attacked, or, in other words, decided the localization of the irritant which led to the disease. This fact had long been recognized in relation to cancer of the lip, mouth and tongue, and recently it had been shown that cancer of the stomach constituted, in occupations exposed to insoluble dust, three times as large a proportion of cancers at all sites as it did in occupations free from dust, including those of professional men. The sites in the upper alimentary canal included more than half the cancers found in males, but in some occupations they constituted only 25% of the total cancers, while in others this proportion rose to over 55%. But because professional men were the class which had the lowest incidence of cancer affecting the upper food passages they did not escape lightly at all sites. On the contrary, they were very prone to cancer of the large intestine, lungs and prostate as compared with those whose occupations involved constant and hard muscular work.

As there were thus well-defined indications that cancer rose and fell in relation to the incidence of phthisis in the occupations, it should be urged that a general reduction in the incidence of tuberculosis would lead to a reduction in that of cancer. This proposition was the more urgent because exposure to tuberculous infection was measured, not by the actual deaths from phthisis, but by the annual notifications of the disease. The notifications each year were 50% higher than the deaths. The first step towards checking cancer should be the regular reduction of the avenues of tuberculous infection. In England at the present moment a new *Diseases of Animals Act* aimed at the eradication of tuberculosis in cattle, although in some counties 40% of the cows were affected.

The correlation of cancer of the upper alimentary tract with the incidence of tuberculosis in the occupations, and of cancer of the large intestine and prostate with the absence of hard muscular work might have a common explanation. Dr. Cherry asked whether a relation might not exist between the conditions of the voluntary and involuntary muscular fibres. Flabby muscles in the body and limbs might denote a loss of tone in the muscular coats of the colon and rectum. With clear evidence that the condition of the stomach was associated with exposure to insoluble dust, might not particles, including tubercle bacilli, come to rest especially in the flexures and act as carcinogenic agents? Perhaps the prostate might be affected by its anatomical connexion with the rectum.

Fevers of the South Queensland Littoral.

DR. E. H. DERRICK (Brisbane) read a paper entitled "Fevers of the South Queensland Littoral". He said that two new fevers had been recognized in south Queensland in the last two years. One of these, "Q" fever, appeared not to have been described elsewhere. About thirty proved cases had occurred. The majority of the patients were meat workers. Most of the others worked on dairy farms in a belt of country (Maleny to Gympie) 60 to 100 miles north of Brisbane.

In most cases the fever lasted about six to eleven days and then ended rapidly, but the duration might be longer and the defervescence gradual. Severe headache was the outstanding symptom. Shivers, sweats and photophobia were frequent. The pulse rate was slow. Younger patients

were often back at work in two or three weeks, but convalescence was more delayed in others, especially older men and after severer attacks. A lymphocytosis developed as the temperature fell. One case in the series was fatal.

Clinically the fever was distinguished from typhoid by the more rapid onset and cessation, from murine typhus by the absence of rash and absence of Well-Felix reaction. The laboratory diagnosis was made by guinea-pig inoculation with subsequent immunity tests. Details of the test were described in THE MEDICAL JOURNAL OF AUSTRALIA of August 21, 1937.

In 1936 the presence of a mild form of leptospirosis was discovered in Pomona, south Queensland. This was 700 miles south of the north Queensland area where leptospirosis was endemic. The Pomona leptospira was distinct from the north Queensland types in its agglutination reactions and it differed from them by being much milder in virulence. In the guinea-pig, for instance, the mortality was only about 10%.

In the human patient this leptospira caused a fever of five to eight days' duration, justifying in the average the name seven-day fever. The symptoms included headache, generalized pains and congestion of the eyes. No patient (in a small series) was known to develop jaundice and no case had been fatal.

Seven-day fever was liable to occur in epidemic form, as at Beaudesert in March, 1937, when twenty patients were admitted to hospital within a week. This pointed to a widespread contamination of the water courses of the district at that time.

The Pomona leptospira was related to the Rachmat leptospira isolated by Baermann in Sumatra in 1923. The seven-day fever of Queensland appeared to correspond clinically with the seven-day fever of the East.

Murine or urban typhus occurred occasionally in Queensland cities, several cases coming under notice each year in Brisbane.

The Rickettsia of "Q" Fever.

DR. F. M. BURNET (Melbourne) read a paper entitled "The Rickettsia of 'Q' Fever". He said that infective material from guinea-pigs showing typical febrile reactions had been inoculated intraperitoneally into mice. Seven to ten days after inoculation, characteristic changes were evident in liver and spleen. Histologically the most important finding was the presence of microcolonies of Rickettsia in cells of the splenic pulp and in the Kupfer cells of the liver. Inoculation of mice with blood clot from a patient with "Q" fever gave the same spleen changes with numerous Rickettsia.

The Rickettsia could be best demonstrated by staining spleen smears by Castaneda's method. The numbers present varied greatly from mouse to mouse, but in some spleens and livers enormous numbers were present. From such tissues it was easy to prepare by differential centrifugation relatively homogeneous emulsions of Rickettsia which could be used for agglutination tests.

Sera from patients convalescent from "Q" fever agglutinated such emulsions sometimes to a titre of over 1 in 200. The agglutination did not appear until between the tenth and fifteenth day after the onset of symptoms. Monkeys experimentally infected showed the same appearance of agglutinins about the tenth day. Normal human and monkey sera showed no agglutination. Serum from a patient with endemic typhus with a high content of X19 agglutinin also showed no agglutination.

Mouse inoculation of blood taken during the febrile period and the use of the agglutination test on sera taken at later stages should, Dr. Burnet thought, provide valuable supplements to Derrick's guinea-pig tests in the laboratory diagnosis of "Q" fever.

DR. J. M. DWYER (Adelaide) said that he was interested with others in the local typhus. They had injected the blood of patients and a large number of rats into guinea-pigs. So far they had not been able to detect Rickettsia in their material. He mentioned three cases in coopers. Many fleas were present in the debris on the floor where they were working. The majority of the cases of typhus

in Adelaide were associated with small goods shops. In one case there was a sore on the abdomen which had represented the site of infection. The agglutination might remain positive for a long time after the attack; in one case for at least three months, in another case for two years.

DR. ALEX MURPHY (Brisbane) said that many of the cases of "Q" fever had been drawn from his wards. He said that cases had occurred from all parts of the abattoir. Some of these workers were not liable to cut themselves at their work and could not, therefore, have been directly infected in that way. He said that one case of "Q" fever had been complicated by encephalomyelitis.

Ten Thousand Blood Counts.

DR. G. C. TAYLOR (Brisbane) read a paper entitled "Ten Thousand Blood Counts, with Special Reference to Idiopathic Microcytic Anæmia". He said that since reading the Goulstonian Lectures of Wits in 1932, he had been struck by the relative infrequency of idiopathic microcytic anæmia in the Brisbane people.

A series of ten thousand blood counts done at the Brisbane General Hospital on male as well as female patients had consequently been examined; Burger and Wits had stated that microcytic anæmia in men and women was strictly comparable.

Of 4,966 female patients, 860, or 17.3%, were found to have colour indices of 0.8 to 0.5, but 497 could be excluded from the idiopathic microcytic class, their anæmia being secondary to other diseases, such as pyelitis, septicæmia *et cetera*, thus leaving 363, or 7.3%, with microcytic anæmia at most.

Of 5,172 males, 636, or 12.2%, were found to have colour indices of 0.8 to 0.5, but 480 of these had conditions which were complicated by sepsis, nephritis *et cetera*, leaving 3% as possibly suffering from microcytic anæmia.

As the records had no case histories and no cognizance was taken of accidents, operations *et cetera*, since it had been the routine practice to estimate the hæmoglobin by the Sahli method, and since 85% by the Sahli method corresponded to 105% by the Haldane method, Dr. Taylor felt sure that these percentages of microcytic anæmia would be very considerably smaller in actual fact.

It had never been his experience or that of many of his colleagues to have seen koilonychia, which was so often described as a sign of this disease; and they had never had colour indices of 0.2, 0.3 and 0.4, which were so commonly reported in the literature.

The necessity of giving massive doses of iron had always been a worry to the scientifically minded worker, and Professor Minot in 1934 had suggested that iron deficiency anemias were not so simple as they appeared; by experiment he had shown that both bile pigments and chlorophyll would enhance the potency of suboptimal doses of iron in microcytic anæmia.

Filmer and Underwood in 1934 had proved that "bush sickness" in cattle and sheep, a condition which was characterized by severe anæmia and long known to be cured by iron in massive doses, was not due to iron deficiency. They had found that this disease was readily curable by an iron-free filtrate of limonite, and in 1935 had discovered that this preparation owed its activity to the presence of cobalt. Marston and Lines in 1935 had reported cures in "coast disease" of sheep—another anæmic condition—with doses of cobaltous nitrate.

Underwood and Filmer had further reported that the value of suboptimal doses of cobalt chloride was improved by the addition of nickel, and Underwood had since shown that cobalt was in impurity in the common therapeutic iron compounds.

Brock and Hunter, writing on the fate of large doses of iron administered by the mouth, had been able to show by balance experiments that considerable iron, even when administered in small doses, was absorbed and stored in considerable amounts, but that it was often only poorly utilized.

Apparently the solution of the problem of microcytic anæmia was far from complete, and Dr. Taylor thought that they might meanwhile take a lesson from the dietary

habits of the Queensland people, who ate more green vegetables and fruit than the people of England. He felt sure that a properly balanced diet would be a much better, cheaper and more pleasant method of treating this form of anæmia than the iron method.

DR. ALEX MURPHY (Brisbane) said that he had found a number of women who appeared anæmic clinically. Their red-cell count would be about four million, and he suggested the term "hypocythæmic anæmia" for this group. When they were given iron, their symptoms were relieved and their count came up.

DR. RAY HONE (Adelaide) congratulated Dr. Taylor on the enormous amount of work represented in his paper. Blood conditions appeared to differ in the different States. The achlorhydric type of anæmia was common in Adelaide. Unless the condition was well marked it was impossible as a rule to tell from the look of the cells in a slide that they were small. The appearance of a patient might be misleading. One patient in Dr. Hone's experience had a high colour, but was anæmic. Pyelitis and hæmorrhoids were common causes of anæmia; the red cell count and the hæmoglobin value were both reduced.

DR. A. H. TEBBUTT (Sydney) said that more work was needed to establish what was the normal standard of hæmoglobin for Australian people. What little had been done did not show that climatic conditions were important; altitude and reduced oxygen pressure were important. He said that the colour standards issued by different firms might vary as much as 10%. The colour indices tended to be high with Haldane's scale. He did not use colour indices much. He preferred to use the method of packing the red cells with a hæmocrit. In Sydney, microcytic anæmia of so-called "idiopathic" type was not at all uncommon in middle-aged and elderly women. In males microcytic anæmia was rarer, but he had followed one case for years. He thought that no satisfactory conclusion had been reached as to why large doses of iron were needed.

The old standard in England for hæmoglobin was 13.8 grammes *per centum*; in America 15.5 grammes *per centum* were accepted, and Price Jones's later work in England gave 14.5 grammes *per centum*.

DR. LUCY BAYCE (Melbourne) had examined seven hundred volunteers for blood transfusions with the "Neoplan instrument", in which fourteen grammes represented 100%. The men had 90% to 100% hæmoglobin, the women about 80%. She agreed that a microcytosis was hard to detect in blood films. At a German hæmatological society it was laid down that hypochromia and planocytosis were the characteristic features of iron deficiency.

DR. TAYLOR, in reply, said that he thought it was likely that in the future hæmoglobin values would all be expressed in grammes *per centum*.

Helminth Infections.

PROFESSOR T. HARVEY JOHNSTON and PROFESSOR J. BURTON CLELAND (Adelaide) presented a paper entitled "A Survey of the Literature Relating to the Occurrence in Australia of Helminth Parasites of Man". This was a continuation of a paper published by them in the Report of the Australasian Association for the Advancement of Science for 1911. After brief mention of some papers published in Australian journals relating to helminth infections in neighbouring Pacific islands, there followed a survey of literature concerning the various species of worm parasites recorded from man in the Commonwealth, these being grouped under Trematoda, Cestoda and Nematoda. Amongst the first group reference was made to the blood flukes (*Schistosomum hæmatobium* and *Schistosomum mansoni*), *Clonorchis sinensis*, *Fasciola hepatica* and *Paragonimus ringeri*. The cestodes included *Diphyllobothrium latum*, *Sparganum* sp. (larva), *Tenia saginata*, *Tenia solium*, the hydatid (*Echinococcus granulosus* or *Tenia echinococcus*), *Hymenolepis nana* and *Hymenolepis diminuta*. The nematodes comprised *Ascaris lumbricoides*, *Enterobius vermicularis*, *Oxyuris incognita* (= *Heterodera radicola*), *Trichinella spiralis*, *Trichuris trichiura*, *Habronema* sp. (larva), *Strongyloides stercoralis*, *Rhabditis*

spp. (coprophilic), *Mermis* sp. (? parasitic in man), *Wuchereria bancrofti*, *Dracunculus medinensis*, *Trichostrongylus colubriformis*, and the hookworms, *Ancylostoma duodenale*, *Ancylostoma braziliense* and *Necator americanus*. It was pointed out that many of the parasites recorded were not endemic, infection having occurred outside Australia. The work of the staff of the Hookworm Campaign and of the Australian Institute of Tropical Medicine was especially mentioned.

DR. G. A. M. HEYDON (Sydney) said that since 1925 he had met with 12 or 20 cases in which the eggs of *Hymenolepis diminuta* were found in the faeces, including one or two in which the adult worms were found as well. He had recovered from a baby an adult specimen of *Dipylidium caninum*, and he had found trichostrongyle eggs in the faeces of a Sydney child.

Periarthritis Nodosa.

PROFESSOR J. B. CLELAND (Adelaide) read a paper entitled "Periarthritis Nodosa". He said that during the course of about 4,100 autopsies at the Adelaide Hospital and the Mental Hospital, Parkside, he had met with three cases of *periarthritis nodosa*, all differing from each other. The first of these cases was published in THE MEDICAL JOURNAL OF AUSTRALIA, February 24, 1923. This was in a lad of eighteen. The patient was in hospital with a vague illness. He became rapidly emaciated, purpuric spots developed, and in the sixth week he had a succession of fits. At the post mortem examination lesions were found in branches of the coronary artery, and also in the kidney, in which there were a number of areas of infarction. No lesions were detected in the brain.

The second case was in a mental hospital patient, aged fifty-one years, who had been in hospital for nineteen years suffering from delusional insanity. On January 17, 1935, he was found to have a right-sided paresis. He died somewhat suddenly on March 26, 1935. The autopsy showed that death had been due to an extensive hemorrhage into the peritoneal cavity from under the capsule of the liver from a focus of *periarthritis nodosa*. There was still much clot in this situation. There was a large hemorrhagic mass at the bifurcation of the trachea, and similar masses around the pancreas, on the outer wall of the stomach, on the outer wall of the intestines, in the kidneys and the right testis. There was a small hemorrhage in the right thalamus.

The third case was that of a messenger boy, aged fifteen years, who developed pains in the back three weeks after tonsillitis, followed by swelling of the legs and then of the lower eyelids. The urine showed the presence of red cells and a few hyaline casts, and the boy was treated as suffering from acute nephritis. He had an oscillating temperature of 101° to 103° F. Autopsy revealed the typical lesions of *periarthritis nodosa* in the vessels of the kidneys together with a very marked glomerulonephritis. In addition, on the mitral cusps was a row of minute bead-like rheumatic vegetations.

Professor Cleland outlined briefly the various theories as to the nature of *periarthritis nodosa*. At present the theory of sensitization, probably caused by some bacterial product, seemed the most likely explanation. In the third case mentioned there were associated together the vascular lesions of this disease and acute glomerulonephritis and rheumatic vegetations. All these three types of lesion had been suggested as of an allergic nature. It was possible, however, that the lesions of rheumatic fever and those of *periarthritis nodosa* might be due to the direct local reaction to some virus or viruses. The association of these three types of lesion, namely, the periarthritis lesion, the rheumatic fever nodes and the glomerulonephritis in a certain number of cases of *periarthritis nodosa*, would suggest that these were possibly etiologically related.

PROFESSOR K. INGLIS (Sydney) said that the record of a case of this disease which was published by Professor Cleland some years ago, had been of great interest to him, for soon afterward he had himself come across a case of the disease. There were striking changes in the heart and kidneys. The coronary vessels stood out with nodules, which on microscopic examination were seen to be aneurysmal bulging. There were paler areas of infarction in the cardiac muscles. The kidneys showed hemorrhages and small infarcts. Professor Inglis raised the question as to what was to be considered the early and essential manifestation of *periarthritis nodosa*, as distinct from the later inflammatory reactions.

The Fibro-Fatty Liver.

DR. S. L. SEYMOUR described a case of hepatomegaly, in which post mortem examination had been performed. The liver was fatty and cirrhotic and weighed 3.8 kilograms (127 ounces). The hypothesis was that the cirrhosis was due to some unknown etiological agent that had become inactive. Dr. Seymour suggested that the fatty infiltration had been caused by excessive indulgence in alcohol. He gave a short review of the experimental work on cirrhosis and suggested that bacterial infection was the main factor in its causation.

DR. J. M. DWYER (Adelaide) referred to the damage that occurred in the liver in acute atrophic conditions and in acute inflammatory conditions, such as syphilis. In those who had recovered there might remain a varying degree of fibrosis. In eclampsia there was a considerable interference with the liver functions, and in these cases complete recovery appeared to occur.

PROFESSOR K. INGLIS (Sydney) said that it was possible to arrange examples of all grades of liver diseases in a series starting with very acute necrosis, through subacute necrosis to the more chronic cirrhosis, but it was doubtful whether it was justifiable to regard necrosis as leading to cirrhosis. He had examined the livers of dogs which Dr. Bolliger had exposed to X rays. In a few of these the fibrosis that followed had been laid down round the periphery of the lobules—the same distribution as in cirrhosis.

Section of Public Health, Preventive Medicine and Tropical Hygiene.¹

President: Professor Harvey Sutton, O.B.E., M.D., D.P.H., B.Sc., New South Wales.

Vice-Presidents: J. Bell Ferguson, M.D., M.R.C.P., D.P.H., Victoria; R. C. E. Atkinson, M.D. (Edin.), M.D., D.P.H. (Cambridge), Western Australia; M. H. Watt, M.D. (N.Z.), D.P.H., New Zealand; F. S. Hone, B.A., M.B., B.S., South Australia.

Secretary: A. R. Southwood, M.D., M.S., M.R.C.P. (Lond.), South Australia.

President's Address.

PROFESSOR HARVEY SUTTON (Sydney) chose as the title of his presidential address "The Child in the Changing World".

¹ The meetings of the Section of Public Health, Preventive Medicine and Tropical Hygiene with the Section of Pathology, Bacteriology and Experimental Medicine, with the Section of Medicine and the Section of Obstetrics and Gynecology, and with the Section of Paediatrics have already been recorded.

He said that his address divided itself naturally into two parts, a plea for further investigation and a discussion of the child in the changing world. The study of sickness was most imperfect, largely owing to failure to keep complete records by many hospitals and many practitioners. Professor Sutton advocated the establishment of a clearing house for complete case records on similar lines to that employed by social agencies for social case records and a thorough training in recording of resident medical

officers in all hospitals. He drew attention to the essential value of properly collected and analysed vital statistics and the statistical value of large samples and especially of group investigations. The records of 100 doctors were immensely more valuable than those of any single member.

Profitable directions for such mass investigations were climatology, which was in its infancy in Australia; racial characters, now that the Australian born of Australian-born parents was at last forming the majority of young adults and children; and inheritance studies. Professor Sutton drew attention to the fruitful possibilities in studying linkages, for example, with the well-known blood groups, or with hair and eye colour of identical twins. The time had come, he held, for the constant use of pedigree records and the profession with its unusually favourable position for gaining accurate knowledge should give a lead by building up a treasury of inheritance from a study of their own ancestors and families.

Great interest had been taken in England and Germany in the mental defective and better knowledge and classification of inherited and acquired types and of the way in which mental defect might be inherited were badly needed. Epilepsy, too, would repay closer study. Such investigations were the natural function and responsibility of the profession in general.

In dealing with the child in the changing world, the outstanding feature in public health was the concentration in this century on the human being—his home and the food he ate. This had made living much safer, even as far as deaths from accident was concerned; it was safer to live today in spite of motor accidents than at the beginning of the century.

The population was gaining in old folk and losing rapidly in the rate of production of babies. The large family had become unfashionable. If the present trend were to continue, the population would cease to increase before 1950. After a few years the relative lack of prospective mothers for the next generation meant, even though the general death rates rose among an older population, a decrease of population. The lack of babies in the last few years was a national calamity. Australia was at the parting of the ways.

Professor Harvey Sutton outlined a programme of reform for the future. Among these were the resuscitation of the family and the reconstruction of the home as a place to deal with healthy living, but also with birth and death and sickness. Social problems and mental hygiene were rapidly progressing and every practitioner should realize the importance of keeping up to date in these social phases of medical practice.

Dr. JOHN DALE (Melbourne) said that Professor Sutton had said that nothing had been done for the mental defective. In Victoria they were beginning to think of this subject and were setting aside three institutions for the management and care of selected cases. He agreed with Professor Sutton's contention that medical practitioners should now discover the home. Most men and women, given reasonable conditions of life, were willing and anxious to found a home, but they were frustrated by the aimlessness of modern civilization and the stress of modern life. People, too, were apprehensive of the possibilities of unemployment for the future generation and contemplated their children being forced to resort to such occupations as salesmanship, really a form of professional lying, or of lapsing into ill-health from mental anxiety. The medical profession, as a scientifically trained group, owed it to the community to grapple with these social problems and to make their appeal through the desire of men and women to have children and to their natural love of children.

Dr. F. W. PONSFORD (Adelaide) said that in his work of examining claimants for invalid pensions a great deal of information was proffered to the medical man, but no effective records were kept. Unfortunately medical men were not educated to the necessity of keeping accurate case records, nor in extracting useful information from them. Medical students should be trained to collect material of statistical value and to analyse the result from a study of them.

Dr. W. CHRISTIE (Adelaide) deplored the fact that medical students were not taught the necessity for careful recording of clinical data. He was interested in a recent publication on the subject of cancer research in which the incidence of the disease in various States was viewed in relation to the climatic conditions. In South Australia the School Dental Service had recently reported that the teeth of children living in the fruit districts were in a worse condition than those in other parts of the State. He could not agree with Professor Sutton that Australians were decreasing in their stature. People seemed to be growing taller. His records showed that young people in South Australia were taller than in any other part of the Commonwealth.

Dr. F. S. SCHOLES (Melbourne) was pessimistic about the future of civilization as he viewed it at present; the fault was partly psychological and partly economic, giving people a feeling of insecurity. There was a rush on the part of all classes to find relief from the stress and strain of modern existence. All spent too much money on amusement and luxury. He could not blame them for that. People could not afford to carry out the ideals put forward by Professor Sutton. They could not afford to have children at home to be sick at home or even to die at home; for everything they must resort to the hospitals. Many thousands of people in Melbourne had been under his constant observation in his years of experience as a medical officer, and careful records had been kept about the condition of the heart, lungs and other clinical conditions; but no note had been made of the colour of their eyes, their weight or their height. It was difficult to find interest in such matters and to know what information was essential.

PROFESSOR HARVEY SUTTON, in reply, thanked the speakers for their remarks. He saw no reason for such a pessimistic outlook on modern life. To read the biography of medical men living in the sixties made people realize that they were much better off today. Present-day standards were much higher than in the past. In a small settlement for unemployed people in New South Wales (Hammondville) the birth rate was high. He said that if the birth rate of 1920 and 1921 had been maintained there would have been 250,000 more people in Australia. The calamity of losing 63,000 lives at the Great War was well known, but the loss of the lives of 250,000 since the war because of the fall in the birth rate was disregarded.

The people who had most money had fewest children. The cause was not economic in the strict sense of the term, but a question of pounds, shillings and pence in itself. Professor Sutton agreed that there was a psychological factor in its causation, and the problem had to be approached on psychological grounds. People were taking a more intelligent interest in the up-bringing of children. Professor Sutton could not agree entirely with the views expressed on mental deficiency. The mental defective had to be supported in a coordinated fashion.

Silicosis among Metal Miners in Western Australia.

Dr. KEITH R. MOORE (Kalgoorlie) presented a paper entitled "Silicosis Among Metal Miners in Western Australia". He said that the records of the Commonwealth Health Laboratory, Kalgoorlie, where employees in the metal-mining industry had been examined every year radiographically, and clinically when necessary in some instances, since 1925, provided valuable material for research work into the question of silicosis and its relationship with infection.

The State legislation governing the mining industry required certification of freedom from tuberculosis, industrial pulmonary disease and certain other conditions on the part of all applicants for employment prior to their commencing work, and also required all employees in the industry to submit themselves for examination when called upon to do so. Medical examination in every instance included a chest radiograph and this work was performed at the Commonwealth Health Laboratory.

Using the available records, Dr. Moore had made an inquiry with the object of throwing further light on the

relationship between industrial pulmonary disease and infection, and also to determine the effect of ten years' work in the industry on the health of its employees.

The effect of elimination from the industry of workers suffering from tuberculosis, whether complicating silicosis or not, and of medical selection of recruits to the industry was shown by the fact that in 1925 to 1926 there were only 80% of normal individuals working as against 93.7% at the present day. The percentage of silicosis in the industry had fallen during that time from 16.1 to 6.0 and the annual incidence of silicosis with tuberculosis and tuberculosis only from 3.5% and 0.3% to 0.2% and less than 0.1% respectively.

The standards of diagnosis of industrial pulmonary disease in its various stages were arbitrary and, as the earlier stages were associated neither with symptoms nor incapacity, radiographic examination was necessary. In this matter experience was necessary, and the first essential was to have a knowledge of the radiographic appearance of the normal chest.

Experience at Kalgoorlie had shown that, as the ante-primary stage of silicosis developed, it did so in two different radiographic types, characterized respectively by fine and coarse mottling. In a series of films examined the ratio of distribution of fine and coarse was roughly four to one in early cases. Advanced silicosis was characterized by gross incapacitation and in a series of cases of this stage the distribution of the finely and coarsely mottled types was nearly even. Among a series of cases of silicosis with tuberculosis, the ratio of fine to coarse mottling was two to one. The inquiry had led Dr. Moore to believe that fine silicosis was a pure silicosis, whereas coarse silicosis represented an industrial fibrosis complicated by infection, presumably tuberculous, which might be latent and antedated the development of fibrosis, or might occur during the period of development.

Instances had been observed of the development in one lung or in one lobe of a lung of a coarse mottling, superimposed on a fine uniform silicosis and rapidly spreading through both lungs.

There was evidence to show that coarse mottling developed more rapidly than fine and was productive of more symptoms and greater incapacitation. On the other hand, tuberculosis might complicate any stage of the development of a fine silicosis without altering its type.

The rate of development of pulmonary disease over a period of ten years was shown in a series of tables according to class of occupation. Of a series of new workers, all of whom were normal at their original examination, over 40% of underground miners and over 25% of the total had shown progression at least to the stage of ante-primary silicosis and 1.3% of the total had developed tuberculosis.

Among a group of mine-workers who were suffering from ante-primary silicosis in 1925 to 1926, over one-fourth had developed silicosis within ten years and 4.2% had silicosis with tuberculosis. Among a further group of silicotic patients, 28% had become tuberculous in the period under review. The percentage incidence of these changes was considerably higher in underground workers than in surface workers. Thus, under present-day conditions in Western Australia, underground mine-workers in a large percentage of cases might be expected to show definite, even serious, incapacity within twenty or twenty-five years from the time of entering the industry. Legislative measures, however, had had a pronounced effect in reducing the amount of industrial disease and infection in the industry.

The Supervision of Air Traffic from Overseas and its Attendant Risks.

DR. F. W. A. PONSFORD (Adelaide) read a paper on the supervision of air traffic from overseas and its attendant risks. He said that frontier defence against international exchanges of disease had undergone progressive developments in adjustment with the changes in travel. With the knowledge of the method of transmission and the incubation period of disease, quarantine measures had been adapted to this knowledge and had become largely

uniform in all countries. With the dramatic development of air transport between countries it had been necessary to review the position.

With the introduction of direct air traffic from Africa to Asia concern was felt that mosquitoes infected with yellow fever might be transported and yellow fever introduced into Asia with disastrous results. Air traffic had increased the danger of introduction of disease from Asia to Australia.

The general international risk had been recognized, and the International Sanitary Convention for Aerial Navigation had been prepared and accepted by all the leading countries, and had come into force in April, 1935. The principles contained in this convention were regulation by mutual consent of the sanitary control of aerial navigation on international routes. The convention dealt with major quarantinable diseases—plague, cholera, yellow fever, typhus and smallpox. Provision was made for the establishment of authorized aerodromes at which aircraft from other countries made their first landing, and of sanitary aerodromes with an organized medical service and hospital equipment. General measures provided for medical inspection of all on board aircraft, prohibition of embarking of persons with infectious disease and reciprocal notification of epidemiological intelligence. Aircraft were subjected to any necessary disinfection or "disinsectization".

The usual quarantine procedure was prescribed for aircraft arriving with a case of one of the conventional diseases on board.

The convention dealt with yellow fever. Where yellow fever existed provision was made for "anti-malarial aerodromes", which were mosquito free.

Medical inspection of passengers and crew and "disinsectization" of departing aircraft were carried out, and provision was made for medical inspection of aircraft on arrival. Each air vessel was required to carry a log, in which endorsements were made at each place of call by health officials.

Landing places for aeroplanes and seaplanes had been proclaimed in Australia. At each of these places hospitals were available, and a Commonwealth Health Laboratory had recently been established at Darwin. Each person on arrival in Australia was required to produce a certificate of vaccination or to be vaccinated at the port of entry.

Plague was transmitted by infected rats, and the possibility of the transport of an infected rat by aeroplane was extremely small. Cholera infection declared itself rapidly and would be discovered before arrival in Australia. The convention prohibited the carriage by aeroplane of articles of food which were specially associated with cholera.

The commoner infectious diseases—measles, diphtheria *et cetera*—were liable to occur from time to time, but presented to Australia only an individual case of a disease already prevalent throughout the Commonwealth.

The greatest apprehension was felt regarding the mosquito-borne diseases—yellow fever, malaria and dengue fever. In respect of yellow fever the time factor operated to cover any risk to Australia, so long as conditions remained as they were. If Asia became infected with yellow fever the situation would become more serious. The international convention provided appropriate measures to prevent the international transport of living mosquitoes. Animals and plants might not be imported by air.

The possibility of the transport of infective material on the wheels of aeroplanes had been considered. No human disease was liable to be so transmitted. Proof of such a possibility with regard to animals was lacking. The transport of seed of weed pests and of plant disease in this manner was considered possible.

DR. M. J. HOLMES (Canberra) said that Dr. Ponsford had very completely described the possible introduction of yellow fever, smallpox and other infectious diseases into Australia by air, and had given an outline of the precautions taken to avoid those risks. The safeguarding of Australia was occurring as far away as Africa, and the barrier was being maintained between Africa and Asia. Recently a system had been introduced for the thorough examination of aeroplanes to search for any insects. These

were identified and examined to see exactly what type of insect was arriving in Australia.

Another problem to be dealt with was the service between New Guinea and Australia. It had been laid down that aeroplanes before leaving the New Guinea airport had to be sprayed to be cleared from insects. The risk of infection from the introduction of aeroplanes was considered to be very remote, as many would not survive the journey.

PROFESSOR HARVEY SUTTON (Sydney) said that Dr. Ponsford's paper was well timed, as he had often been asked about the possibility of danger from air traffic. He wondered whether typhus would ever establish itself in Australia. He would like to make a protest in regard to the new jargon introduced in the subject of aeroplane traffic. He had never heard of the word "antiamaryl", and he thought that an international court of justice should be set up to protect them from such dreadful pests as deinsecticidal, decontamination, deratization, defitting and such like words.

Dr. PONSFORD, in reply, explained that the term anti-amaryl was used to indicate the prevention of yellow fever by the mosquito. Many of these terms had been adopted in the same way as American slang had entered into the language. The Commonwealth Government was fully cognizant of all the risks attending air travel, was keeping in touch with the latest air information, and was ready to introduce necessary legislation to protect the population from epidemic disease.

Tuberculin, Schick and Dick Reactions in Central New Guinea Natives.

Dr. G. A. M. HEYDON (Sydney) read a paper on tuberculin, Schick and Dick reactions in central New Guinea natives. He said that observations had been made in two localities of the high interior of New Guinea, one the western end of the Wahgi Valley near Mount Hagen, and the other the Upper Ramu. In both districts, but especially in the Wahgi Valley, the natives had only recently and to a slight extent come in contact with the outside world. A general account of the country and inhabitants might be found in *The Australian Geographer* for May, 1936, by A. J. Bearup, who, with Dr. Heydon, had formed the expedition to these regions from the School of Public Health and Tropical Medicine, Sydney.

All the tests had been done on the skin of some part of the arm. A control fluid was always used. Under "children" were included natives judged to be less than fifteen years and more than two years of age. The reagents used had never been exposed to high tropical temperatures and their potency had been verified.

Tuberculin tests consisted of von Pirquet tests with the tuberculin and glycerine broth control fluid supplied by the Commonwealth Serum Laboratories, and of Mantoux tests with intradermal injections of 0.1 cubic centimetre of 1 in 1,000 dilutions of each of these fluids with physiological salt solution. Readings had been made after a forty-eight hours' interval.

Von Pirquet tests had been made on 416 adult Mount Hagen natives; five reacted, a percentage of 1.2; of 151 children, none reacted.

Von Pirquet tests had also been made on most of the natives from other parts of New Guinea employed near Mount Hagen, all of whom had had some slight contact with civilization at coastal or other settlements; of 56 tested, 13 reacted, a percentage of 23. Several of these reactions were classed as "strong" ("pseudopodia" present), whereas the five reactions of the local natives were all weak, and four of them were classed as "very weak" (very slight papular elevations not more than five millimetres in diameter).

On the Upper Ramu, von Pirquet tests on 86 local natives had yielded one reaction classed as "weak", but Mantoux tests on 114 (mainly adults—most of them tested by von Pirquet tests simultaneously) had given 11 reactions, none of them very pronounced. Of the nine reactors who were tested by both methods, eight had reacted to the Mantoux test only.

Here Dr. Heydon mentioned 105 von Pirquet tests which he had made a year earlier (January, 1934) on local natives, mainly adults, in the same district of the Upper Ramu; none reacted. Some of the tuberculin brought back from this trip had been tested by Dr. Backhouse on 44 adult indentured natives in Rabaul; 50% reacted, some of them strongly.

Indentured male natives in Rabaul had been found to give von Pirquet rates from about 35% to 70%. In Hanuabada village at Port Moresby, Clements found in 1935 a Mantoux rate of 77% in 1,037 adults.

Schick tests on local natives had yielded at Mount Hagen no reaction among 136 adults and one reaction among 84 children (mean age 9.7 years). At Upper Ramu four reactions occurred among 121 adults and eight reactions among 97 children (mean age 6.5 years). The high percentage of "immunes" was, of course, striking; the difference between the Ramu and the Mount Hagen figures was just about significant statistically for both children and adults.

Diphtheria toxin supplied by the Commonwealth Serum Laboratories for the Schick test had been used, but instead of one test dose in 0.2 cubic centimetre of saline solution being injected, 1.25 test doses in 0.1 cubic centimetre were used. Toxin heated for fifteen minutes at 75° C. had been used as control. Dilutions had been made just before use. Results had been read at four days and often earlier and later as well. Schick tests were not difficult to read in dark skins, but the changes in the epidermal surface, seen best at a rather late period, were of rather more value than erythema and pigmentation.

After Dr. Heydon's return, children of Blackfriars School (from the poorer quarters of Sydney) had been tested with some of the Schick toxin carried throughout the trip and simultaneously with freshly supplied toxin. In no case did the results differ; out of 60 children tested (mean age 6.3 years) 46 reacted, a percentage of 77.

Dr. Heydon then described the results of the Dick tests. At Mount Hagen two out of 27 adult natives reacted and five out of 46 children (mean age 9.2 years); at Upper Ramu three out of 118 adult natives reacted and 27 out of 92 children (mean age 6.7 years). On his return, some of the toxin carried throughout had been similarly tested against freshly supplied toxin on 48 Blackfriars School children (mean age 6.5 years); 13, or 27%, reacted to both batches, and the only difference noticed was a slightly less tendency to pseudo-reactions in the toxin carried in New Guinea. For the Dick tests the toxin had been diluted 1 in 1,000 with saline solution just before use and the same heated for two hours at boiling point of water had been used for the control; 0.15 cubic centimetre was injected and results were read next day.

The reading of Dick tests in dark skins was not very easy. It had been found advisable to make the test and control injections on exactly corresponding spots of different arms, and the best spot was the inner surface of the upper arm, where the skin was least pigmented and erythema least obscured.

Dr. F. W. CLEMENTS (Sydney) said that in Hanuabada the high extent of tuberculosis amongst the natives was one of the greatest problems, and in Port Moresby, the seat of government for Papua. The natives there were almost decimated by the disease, and he noted with interest that in Dr. Heydon's New Guinea survey only a very small percentage had reacted to the Mantoux test. The question of the spread of infectious diseases through the native population was an interesting one, but certain diseases, such as anterior poliomyelitis, had spread 180 miles inland and had come along by way of the trade routes over the ranges from the Mandated Territory. Twelve cases showing a residual paralysis had been introduced in this way in the epidemic of 1927.

Dr. JOHN DALE (Melbourne) asked whether the brown skin of the natives interfered with the recognition of lighter Mantoux reactions, and he wondered whether it would not have been worth while to employ a toxin of 1 in 100 dilution, when so few reacted to a dilution of 1 in 1,000. He thought it possible that the high incidence of tuberculosis in natives in certain localities might be

due to their living conditions. If these could be improved there might be less predisposition to disease. He thought, too, that a stronger dilution might be tried with the Schick test when reactions were so few. He would like to know whether this test was difficult to read. Perhaps the reason for the immunity of natives from these diseases was due to the habit of life encouraging a free interchange of respiratory organisms. This was not so in white people, as white children were kept more apart.

PROFESSOR HARVEY SUTTON said that the diet of a native might perhaps be deficient in vitamin B, but they were certainly well nourished until they developed tuberculosis. They were also accustomed to an open air life, and Dr. Clements would say that Hanuabada was a model village. In regard to diphtheria, there had been many cases in Palestine in which virulent diphtheria bacilli were found in body sores, when it was known that they could be recovered from the throat of the patient.

DR. HEDDON, in reply, said that a great deal of care had been given to the reading of the various tests in New Guinea, and after some experience had been acquired he had readily been able to detect a papular elevation at the site of injection, and even slight reactions could be made out. After experience it was possible to read the same number of positive reactions among natives as among whites in control tests carried out later with Rabaul natives, and they had obtained 50% of positive reactions. Dick tests were more difficult to read, but were made easier when the site selected was the inner aspect of the upper arm, where the pigment was less pronounced.

Scarlet Fever.

DR. F. V. SCHOLES (Melbourne) read a paper entitled "Is the Hospital Treatment of Scarlet Fever Worth While?" He said that scarlet fever was a notifiable disease that for generations had been accepted as necessitating isolation, careful nursing and, nearly always, hospital treatment. Early in the present century the continued decline in the mortality rate had begun to arouse doubts concerning the need for almost universal hospital treatment. The incidence continued to be high, and people began to wonder whether public money should be spent on isolation, which had no effect on prevalence. On the other hand, the individual citizen would be in favour of the isolation of any sufferer at a boarding school or other establishment attended by his children. He would be correct in assuming that such isolation would considerably decrease the risk of his children's infection. Furthermore, medical practitioners were aware of the danger of attending patients with scarlet fever at home, and at the same time conducting midwifery and other practice. Although patients treated at home had a social and financial status different from that of the average hospital patient, Dr. Scholes had formed the opinion that, even under the best conditions, the results of treatment of the disease in its early stages were not so good in the home as in hospital. If patients could be discharged with safety immediately they had passed the acute stage of the illness, there would be no doubt about the advantages of hospital treatment. The working man found it cheaper to pay his share towards hospital upkeep than to have his children treated at home, with the added risk of the spread of infection in the household. Also, nowadays, the number of houses in which satisfactory treatment could be carried out was diminishing.

Dr. Scholes believed that isolation in hospital in the past had been a good thing, and hospital treatment in the early stages of the illness was still a good thing. It was possible now to remove many of the unsatisfactory features of the treatment during convalescence. It was only in the attention to convalescent patients that hospital treatment had failed. To study the cause of this failure it was necessary to consider the definition of scarlet fever. Scarlet fever was caused by a streptococcal toxin. If insufficient antitoxin was produced, a rash appeared. There was no rash if the patient produced sufficient antitoxin quickly enough. The syndrome of scarlet fever could be produced by the deliberate administration of toxin. The portal of entry of the streptococcus did not

matter; the development of scarlet fever depended on the toxigenic qualities of the invading organism and the antitoxic qualities of the infected subject. Scarlet fever was a group of symptoms, nothing more. Why, then, were notification and isolation necessary in streptococcal infection when it produced a certain group of symptoms, and only then? Epidemics characterized by follicular tonsillitis, with or without *otitis media*, by nephritis and cervical adenitis, were not essentially different from epidemics of scarlet fever. In ideally selected populations they would have been epidemics of scarlet fever. It was absurd to select one special group of patients for isolation and hospital treatment to the exclusion of others. Dr. Scholes suggested that patients with acute tonsillitis and otitis should be investigated bacteriologically, and that, if practicable, they should be isolated and treated at home. The necessity for admission to hospital should not be determined by the presence of an unimportant symptom, such as a rash on the skin. The same remarks applied to notification.

The acute symptoms of the illness could be satisfactorily dealt with. Certainly some patients were overwhelmed by the toxin and killed, and others suffered from suppurative or ulcerative processes or other complication; but as a general rule there was little trouble until the period of convalescence was entered, when one did not know what would happen. The really unsatisfactory, and sometimes dangerous, period was after the patient had recovered from the disease, and often after he had left his bed. It had been shown that relapse and various complications during the period of convalescence were due to infection with another strain of streptococcus, and that infection was direct, or nearly direct, from person to person. But there were other possible ways of infection; for example, by air, by flies and by nurses and medical attendants.

Dr. Scholes sketched an outline of a system of isolation and treatment in hospital. (a) Patients should be isolated individually, pending the typing of their infecting organisms. (b) When the typing was completed, patients should be segregated accordingly. (c) In convalescence segregation according to type should be continued, and separate playing areas or separate periods in the one playing area should be made available for patients with each type of infecting organism.

Dr. Scholes said that he was optimistic enough to hope that by the employment of these methods the great majority of children with uncomplicated scarlet fever would make an uninterrupted recovery and would need to stay in hospital little longer than three weeks, and that prolonged infectivity, complications and cross-infections would be a rarity. If these hopes could be realized, hospital treatment of scarlet fever would be worth while.

DR. P. T. S. CHERRY (Adelaide) wished to know whether the isolation of scarlet fever cases was really necessary. Scarlet fever as an epidemic was not very common, as it was unusual to get more than one case in the home. Perhaps the other children in the house had developed immunity to the disease. In spite of the fact that the mother had to attend to the patient's room, preparation of food and the cooking, it was his experience that rarely did a disease run throughout a household. He would like Dr. Scholes's opinion as to how long a scarlet fever patient should be isolated. In a case of which he had knowledge the child recovered well, and was isolated for at least three or four weeks. Four weeks later another member of the family contracted the disease, and the mother assured him that there had been no contact. That child must have been infected at a later date from the first case. Dr. Cherry instanced the case of a nurse who had never developed scarlatina rash, had no sore throat, and continued to attend patients until desquamation was noticed, but no one became infected. This also raised the question whether isolation was necessary. He considered that any patients with serious infections needing special treatment and care should be sent to hospital. He asked Dr. Scholes whether fumigation was necessary after scarlet fever, and if it would be efficient. It seemed necessary to heed the old theory of fomites and fumigation in order to satisfy the public opinion, but it seemed doubtful whether efforts to fumigate were really effective.

Dr. C. N. ATKINS (Hobart) said that he had noticed that it was in the so-called mild cases of scarlet fever that complications often occurred. He was interested in Dr. Scholes's remarks about the different types of organism in this infection, and in his own hospital would endeavour to separate the types in different parts of the building.

Dr. J. BELL FERGUSON (Melbourne) recalled the time when scarlet fever had frequently appeared in a severe form, when they used to keep patients isolated for six weeks or longer. When he went to Leicester as medical officer of health, a colleague had recently shocked the profession by a paper entitled "Is Scarlet Fever Isolation Worth While?" He had quoted his experiences in many towns in England where isolation was carried out in 80% of all cases, and a review of the figures extending over a period of ten years indicated that the mortality was greater and complications more numerous when fever hospitals came into more general use.

Dr. GEORGE COLE (Victoria) drew attention to the effect of isolation from the point of view of the general public. The man in the street was impressed with the idea that scarlet fever was an extremely infectious disease and must be isolated immediately, while in Dr. Cole's opinion whooping cough was more infectious and more dangerous if it was simply disregarded.

Dr. JOHN DALE (Melbourne) was impressed with Dr. Scholes's suggestions in regard to either the redefinition of scarlet fever or even its abolition. He was curious to know whether it would be possible in practice to apply the procedures mentioned by Dr. Scholes to identify the various types of hemolytic streptococci.

Dr. A. R. SOUTHWOOD (Adelaide) said that apparently they were concerned with one of those subjects in which there was a danger of knowing too much. At one time it had seemed so easy; now too much was known. A rash of scarlet fever was only one of a collection of symptoms and was not a disease in itself. It was only one outward evidence of the existence of the toxin. The function of an isolation hospital was originally thought to prevent spread through the community, and before the new view was accepted, it would be necessary to have a definite plan to replace the old. The typing procedure was interesting, but he wondered whether it was really practicable. Before accepting the idea of discarding notification, they should devise a rational procedure to replace one that was becoming ingrained in the public mind.

PROFESSOR HARVEY SUTTON (Sydney) said that it was axiomatic that hospitals did not prevent the spread of an epidemic. He could not agree with the view that they should be influenced by the public opinion. They should decide first what should be done, and then proceed to educate public opinion. They should not even give colour to the suggestion of respecting public opinion in their own discussions. Another side of the question worth considering was that they had to face the cost of hospitals, and to utilize them for this purpose was a sheer waste of public money. Scarlet fever was one of the mildest diseases from which children could suffer. The mortality from whooping cough was much higher. He did not believe that the modern homes of bungalow type could not be made effective in most cases for the purposes of carrying out isolation of a patient, and the health authorities should cooperate with the general practitioner. Medical practitioners would be wrong in insisting that most patients should be treated in hospital.

Dr. SCHOLES replied that he wished to insist that the first half of his paper suggested that scarlet fever patients should be taken to hospital promptly for treatment rather than for isolation purposes. Some patients were treated at home as being mild in the first instance, but later developed serious symptoms. In these cases better results in the acute stage would certainly have been obtained in the hospital, where expert care and attention were available. He considered that in a young child there was such a thing as scarlet fever. Cases of tonsillitis and middle ear disease in which the causal organism was the hemolytic streptococcus, were scarlet fever cases in the fullest sense of the word.

Government Control of Tuberculosis.

Dr. H. W. WUNDERLY (Adelaide) read a paper entitled "Some Aspects of Government Control of Tuberculosis". He said that after hearing such excellent discussions on the various aspects of the tuberculosis problem, he felt that there was very little left for him to say. There were, however, five or six points which he wanted to bring before the section in the hope that members would give them in South Australia the benefit of their experience.

There was not sufficient evidence for them to know to what extent the bovine bacillus was responsible for infection. Dr. Holmes's figures showed that most cases of joint and bone disease were caused by the human type of bacillus and that the majority of the cases of glandular tuberculosis were the result of a bovine infection. While the bovine organism was responsible for only a small mortality, they had no idea of the extent of the morbidity caused by the bovine bacillus in the community. He suspected that it was very much larger than they cared to admit.

There were two methods of attacking this problem of bovine infection in human beings: (a) to eradicate tuberculosis in cattle and/or (b) to pasteurize all milk.

Apart from a small depreciation in the vitamin C content, milk from the point of view of nutrition was unaltered by keeping it at a temperature of 154° F. for thirty minutes. Dr. Wunderly said that he would leave it to those present to show how it was possible to convince the various governments of the urgency of this aspect of the problem.

The second point that he wished to discuss was that it was essential to track down the "open" case and prevent it from acting as a source of contagion to others. Medical practitioners should be untiring in their efforts to find these "open" cases. It was the presence of the "open" cases in the community that was keeping tuberculosis a current problem amongst them. Collapse therapy, when it could convert these "open" into "closed" cases, became of epidemiological importance. Those who remained "open cases" in spite of all endeavours should be educated so that they would no longer be a menace to those around them; if this was not possible, the question arose of the necessity for some legal power whereby they could be compelled to remain in sanatoria where their habits could be controlled.

For maximum efficiency in the campaign against tuberculosis, there should be a sufficiency of facilities for testing the most seriously ill of the patients and those who were unable to provide for themselves or who were unable to follow the directions for preventing the spread of infection.

Dr. Wunderly went on to say that as the result of a survey in Massachusetts, a relationship had been discovered between annual deaths and existing active cases. From this it was possible to set up a standard for the number of beds needed for patients with tuberculosis.

In America it had been suggested that there should be one bed per annual death. In South Australia they had just over one bed per death—245 beds and 235 deaths in 1936. They were finding this very inadequate and really needed 1.5 to 2 beds per annual death, as had recently been suggested by Chadwick. Adequate provision of institutional treatment was almost invariably associated with a correspondingly low death rate from tuberculosis. Further, it was uneconomical to try to provide efficient treatment in an institution of less than 100 beds, and the Joint Tuberculosis Council had suggested a 250 bed unit as the optimum size for a combined institution. Dr. Wunderly's third point was therefore the need for a sufficiency of beds collected into large institutions.

If the plan of attack was to wait till the patient with positive sputum presented himself for examination, they would have fulfilled their mission if they were to do everything possible to change these "open" into "closed" cases, and if that was not possible, to prevent them from spreading infection. This was a very important part of the campaign, but it was humiliating to find that the progress of the individual case had been little improved by the use of modern methods of treatment. D'Arcy Hart had stated that the decline in mortality was probably due to the decrease in incidence of new cases rather than to a reduction in the case-fatality. The plan, therefore, had to be extended and the patients when they were in the

pre-clinical stage had to be found. Tuberculosis was of such insidious onset and cause that patients in general did not seek advice till late in the disease. This "case-finding" could be tackled effectively in two ways: (a) by the examination of all contacts with cases of known disease, (b) by an investigation of whole communities.

Dr. Wunderly recommended the annual examination of all members of households of which some members suffered, or had suffered, from tuberculosis.

Dr. Wunderly said that time would not allow him to dwell longer on the fourth point, which was that cases had to be found in their pre-clinical stage. In group surveys he would suggest families as units or young adults of from fifteen to twenty-five years of age in the large department stores.

Fifthly, in this case-finding there had to be a planned method of procedure. All people being investigated should be subjected to a Mantoux test with a tuberculin which had the following four requirements for a standard tuberculin for general use: specificity, constant potency, stability and non-sensitizing nature. In Dr. Wunderly's experience the tuberculin of the Commonwealth Serum Laboratories had fallen short of this ideal, and for many years he had used the tuberculin of the "I.G." and more recently "P.P.D.", which was put up in tablet form.

There was no need to photograph those who did not react to the Mantoux test, but the positive reactions should be examined radiologically—90% to 95% of lesions could be detected by fluoroscopy.

Dr. Wunderly's sixth and last point was what should be done with persons who did not react to the Mantoux test but who were compelled to remain in contact with tuberculous patients. He referred particularly to nurses, medical students and practitioners, and hospital attendants. In his opinion it was not wise to allow people who failed to react to the Mantoux test to fill these positions, and either they should be excluded or an attempt should be made by the use of "B.C.G." vaccine to convert them into positive reactors. This had been done very successfully in the Scandinavian countries. Dr. Wunderly wished that he had had time to discuss at greater length the use of "B.C.G." vaccine, but he wished to submit the proposition that it was only allergic people who developed the ulcerative or adult type of pulmonary tuberculosis. There was a mass of evidence that a primary infection contracted in adolescence or young adult life, if the subject was not continually exposed to reinfection, ran the usual benign course of the childhood type of tuberculosis.

In conclusion, Dr. Wunderly said that in the attempt to control tuberculosis they had to eradicate bovine tuberculosis, and until that had been done all milk should be pasteurized. They had to track down the "open" case and to provide adequate facilities for treating all sufferers. They had to go out and find the cases in the pre-clinical stage, for there was an average interval of three years between the appearance of X ray evidence and the recognition of symptoms and clinical signs. Early tuberculosis, like the obedient child, was seen but not heard. In this case finding, it was essential to use a standardized, stable tuberculin; and those who did not react to the Mantoux test had to be protected from frequent exposure to infection.

DR. J. G. SLEEMAN (Adelaide) said that in South Australia any attempt to check the spread of pulmonary tuberculosis by legislation was limited to the notification of diseased persons; it was understood that legislative measures modelled on the English act and designed to admit of the compulsory isolation of infected persons who were a menace to the community had been contemplated, but, so far, nothing of the kind had been placed on the statute book.

The persuasive attempts were much the same as those existing elsewhere, namely, the identification and examination of contacts. The names of contacts were obtained mainly from the patients themselves, the nurses of the Central Board of Health being able, after their visits of inspection, to add perhaps to the list. The authorities of the Children's Hospital were further helpful. At this institution Mantoux skin tests were carried out as a routine measure and the parents of any child found to give a positive reaction were advised to report for examination at the chest clinic, Adelaide Hospital.

At this clinic examination for diagnostic purposes was free, and included ordinary physical examination, the performance of Mantoux tests and X ray photography; should disease be found and treatment considered necessary, payment according to the patient's means was requested.

So far no group surveys had been made, except that the second and fifth year medical students, as a result of a decision of the Faculty of Medicine, had been examined, together with students of other years and courses. The number examined was 140, mainly of the ages sixteen to twenty-five: two had been found to be suffering from pulmonary tuberculosis. It should be mentioned, of course, that the nursing staff of all Government institutions dealing with pulmonary tuberculosis were examined every year.

In view of the statistics furnished by Dr. M. J. Holmes regarding the incidence of the disease and the mortality therefrom in South Australia in the age group sixteen to 25 among females, it would seem desirable to continue this examination, particularly among the female students. At the same time the examination of shop assistants and the like of the same age should be undertaken so that, not only might the incidence of the disease in this whole age group be determined, but in the course of the survey some information be gained as to the real reason for South Australia's unenviable position in this particular direction.

Attempts to limit the spread by dealing with the established sputum positive case consisted of (a) appropriate treatment, (b) education in hygienic methods of living, (c) voluntary isolation in hospital if the patient was incurable and ineducable.

Up till the present time no broadcast talks had been indulged in, and newspaper publicity had been very restricted.

DR. D. B. ROSENTHAL (Melbourne) said that in his experience fluoroscopic examination without the taking of a plate was not sufficient evidence on which to base diagnosis of tuberculosis. Without exception, every patient should have a radiograph taken. Many patients knew themselves to be ill, but would not report; they attributed the cough to smoking, the tiredness to late nights, and the loss of weight to dieting. If fully educated to the position, more people would report earlier. Not enough emphasis had been placed upon the value of sanatoria. They were the backbone of the system of management. In Victoria every patient was obliged to go through a sanatorium where an important part of the training was carried out. There the patients learned how to live, how to adapt themselves to their new situation, how to guard their sputum, and to understand principles of diet. They were also taught their responsibility to the community.

DR. ALLAN PENINGTON (Melbourne) said that in sanatoria the medical superintendent should educate the patient on the lines laid down by Dr. Rosenthal. The patients, in turn, talked to their friends, who were then more likely to report at once if they had any suspicions that they might be suffering from an early infection. He believed in medical men in charge of sanatoria having complete control of their patients.

DR. COTTER HARVEY (Sydney) spoke about the possible danger of hospital nurses contracting the disease. Recent literature from America pointed to the fact that nurses were susceptible to infection. At the Royal Prince Alfred Hospital, Sydney, a surgeon had recently succeeded in persuading the Board of Directors that tuberculosis was a highly infectious disease, since when the nurses in attendance on tuberculous patients were required to wear cap and gown, and even mask and gloves. He wished to know if those present were intending to treat their nurses as if they were attending patients with scarlet fever or diphtheria. The danger of creating phobia was a real one. It might be decided at the meeting what measures should be taken to protect nurses from the danger of infection.

DR. J. BELL FERGUSON (Melbourne) agreed that there was a danger of creating phobia and that definite steps should be taken to protect nurses, about 2% of whom developed clinical adhesions each year. In sanatoria the figures given were 0.8%. Dr. Ferguson thought some

definite information on this subject should be obtained and that those in charge of general hospitals should have the necessity for greater care in handling the ordinary type of patients brought to their notice. It was very rare to hear of nurses becoming infected in sanatoria. Dr. Ferguson would like to see a standing rule adopted that sisters in charge of wards should be allowed on their own initiative to send any specimens of sputum to the laboratory for examination without reference to the resident medical staff. This would be a protective measure in the interests of the nurses.

Dr. J. G. HISLOP (Perth) said that at first it was a disadvantage not to have some standard method for the destruction of infected sputa in private homes. Probably, if thirty general practitioners were asked what method they employed for the destruction of germs in sputa, twenty-five different answers would be obtained. It would be a step forward to have a standard method for this purpose. Secondly, whenever Dr. Hislop saw tuberculous patients segregated together, he felt that the risk to nurses was always very much less; for instance, at Brompton Hospital in London, only an infinitesimal number of cases had occurred amongst nurses over a great many years. Medical practitioners deserved to be severely indicted for not segregating their tuberculous patients from the general wards of hospitals. If nurses were told that they were handling tuberculous patients, risk would be much smaller than if they were ignorant of the fact. Dr. Hislop agreed that the ward sister should have authority to have any sputum examined in her ward without reference to the medical officer. He doubted whether the honorary medical staffs of Australian public hospitals sufficiently supervised the food requirements of the nursing staff.

PROFESSOR HARVEY SUTTON (Sydney) said that the meeting could well make representations to Dr. Holmes of the Commonwealth Health Department, who was present, because he might see fit to make a special departmental report upon the possibility of infection in public hospitals. He thought that American hospitals differed in some respects from those in Australia, in that there might not be the same interchange of air as the windows were frequently kept closed. More attention should be paid to statistical matters, especially in regard to hospital records, in order to show the comparative figures. Information should be available as to how many cases occurred in women of the same class and age, who were not professional people. He thought that there should be more frequent investigation of nurses and medical students.

Dr. JOHN HUGHES (Sydney) said that he had been most impressed with the Adelaide clinic, and that in his opinion they had nothing in New South Wales to equal it; but he thought that their plan of campaign was lacking in certain respects, firstly in regard to education, and secondly in regard to contacts. To educate the public there must be a story to tell, and it was necessary to see that fear was not created in the minds of the people. In New South Wales the story was told by medium of newspapers, lectures and the radio. A wireless talk had always produced two or three people coming along to the division daily in order to make personal inquiries. They liked to make it clear that the disease, like a well brought up child, was "seen and not heard"; that it was a familial concern, and that X ray examination was absolutely necessary. In South Australia nurses should be under the control of the medical officer, and through him should assist him in the campaign of education. He thought that the rehabilitation of tuberculous patients was of great importance, and in Adelaide he deplored the lack of cooperation with the Red Cross Society, which was regarded as a most important factor in Sydney for providing comforts and sanatoria, and for public propaganda.

Dr. M. J. HOLMES (Canberra) wished to point out that the Red Cross was primarily a military organization. It had come into existence during the Great War, and at the completion of hostilities had considerable funds at its disposal for this kind of work. It was not entitled to raise money for this particular purpose, so that the South Australian Red Cross could not be blamed for not participating in this work.

At the plenary session Dr. Bull had said that he did not think Australian figures were right in regard to bovine tuberculosis. The position in Australia was that in not a single instance was the bovine type isolated from a bone or joint lesion. The work of typing the bacilli from various lesions should be carried on.

Dr. Wunderly, in reply, thanked the various speakers for the criticism of the South Australian scheme, which was only in its initial stages. Criticism at this stage was more valuable than praise. The Commonwealth Government should be vitally concerned in the question, because of the invalid pensions, if the survey was going to be made. Could the Commonwealth Department supply sufficient serum for the tests? Secondly, could the Commonwealth Department in an advisory capacity formulate some standardized precautions for nurses, and lay down definite rules for the safest way for dealing with sputa in these cases? Personally, Dr. Wunderly recommended paper handkerchiefs, which could be completely destroyed by burning.

Morbidity in Tropical and Subtropical Queensland.

Dr. A. H. BALDWIN (Sydney) presented a paper entitled "Observations on Morbidity in Tropical and Subtropical Queensland". He stated that the prevailing impression was that tropical diseases differed considerably from those in regions outside the tropics. In tropical Queensland an almost identical sickness and death rate prevailed as in the non-tropical part of the State. The differences that did occur were differences in the proportion of sickness caused by different types of disease. The crude death rate for coastal tropical Queensland for the year 1934 was 8.67 per thousand of population; for subtropical coastal Queensland it was 8.67 per thousand. The crude death rate for Australia in the same year was 9.32%, and for New Zealand 8.48%. The estimated sickness rate in coastal tropical Queensland was 204%, and in coastal subtropical Queensland 195%.

Dr. Baldwin stated that in the tropics parasitic and infectious diseases were more prevalent than in the temperate zone, and diseases of the digestive system in general were less prevalent. Diseases associated with pregnancy and labour were more numerous; the same was true of diseases of the skin. The rate for alcoholism in the tropics was estimated to be three times that in the subtropics. The rate for accidents was very high in the tropics. Contrary to what might have been expected, the figures indicated that bronchitis, acute and chronic, and rheumatism, acute and chronic, were more prevalent in the tropics. Moreover, although the incidence of scarlet fever in the tropics was much less than in the subtropics, the disease was by no means absent. The compensations of the tropics appeared to be a reduced incidence of diabetes, at least on the coastal area, of certain nervous disorders and of certain arterial diseases. Dr. Baldwin concluded by calling attention to the necessity for reduction in the incidence of alcoholism, diseases associated with pregnancy and labour, and accidental injuries.

The Typhus-Like Fevers of North Queensland.

Dr. W. C. SAWERS (Sydney) and Dr. A. H. BALDWIN (Sydney) presented a paper entitled "An Investigation into Certain Aspects of the Typhus-Like Fevers of North Queensland". The authors began by briefly giving the history of the term "typhus fever". They stressed the great confusion in terminology that had resulted from many fevers in different countries having been given distinctive and often local names though they were clinically similar to typhus fever and though epidemiologically they were very different from it. Some of these conditions were very closely allied to each other, and indeed might be identical. They pointed out that classical typhus fever had as a vector the louse, and as a reservoir man. In some typhus-like diseases, ticks, mites or fleas had been incriminated as vectors, and in others the vectors were still undetermined. The reservoirs of typhus-like fevers were generally considered to be rodents, although in some cases the reservoir was still doubtful or unknown. The authors then referred to the extensive serological investi-

gations that had been carried out over many years, after the first use of the agglutination test in typhus fever had been made. They pointed out that it was necessary that sera of patients suspected of having contracted this fever should, in view of modern advances, be tested by emulsions of *Proteus* X19 and *Proteus* XK, and that the "O" form should be utilized in these tests. The Well-Felix test, although unexplained, was of the greatest diagnostic value. Cross-immunity tests had now been made possible. A classification based on serological reactions, combined with information as to the vector, would be very valuable. The authors then went in some detail into the history of typhus fever in Australia.

Coming to the present investigation carried out in the north of Queensland, the authors, discussing the epidemiology, pointed out that little actual written data had been available, but they gave the information that had been obtained. It appeared that in general adult males were attacked; children were not exempt, though the attacks they suffered were less severe. Males were more often attacked than females, which was probably due to occupational pursuits involving greater risks of infection. In almost all cases a history of exposure to scrub conditions was obtained, and affected women and children always gave some history of having frequented the scrub. Opinions varied greatly on the question of seasonal prevalence; these variations might just possibly be accounted for if more than one arthropod vector of the virus was concerned. Divergence of symptoms in different areas supported this view. Little permanent immunity followed an attack of the disease. The incubation period had not been definitely fixed, although details of one case suggested that fourteen days might be the length of time. Bites or ulcers did not as a rule occur. The onset of the disease was generally sudden, with severe headache, pains in the limbs and lumbar region, and a rise in temperature. The majority of observers in north Queensland had found that a rash was by no means constant, either in occurrence or in character. Headache, photophobia, deafness, conjunctival congestion and respiratory symptoms were very common; some patients became delirious and others comatose. Albuminuria was fairly common, as was glandular enlargement; enlargement of the spleen was not common. When the disease was fully established, the ratio of the pulse to the temperature was low. Severe cardiac involvement and toxæmia were common, and vomiting occasionally occurred. The course of the illness was between ten and twenty-one days; termination was generally by rapid lysis, occasionally by crisis. Possible complications were bronchitis, bronchopneumonia, phlebitis and tachycardia; in ordinary cases convalescence was usually rapid. The mortality in general was low. The prevalent type of reaction to the agglutination test was "Kingsbury".

After describing the method of procedure in examining rodents, the authors stated that in all fifty-four animals were completely examined, and went on to enumerate and to describe the parasites found on them. They then proceeded to the serological investigations that they had carried out. They stated that the cultures used in the agglutination work were OX19, OXK and OX2 strains of *Bacillus proteus*, and the sera tested were human and animal. With regard to the human sera, they had found the results of the agglutination tests to be clear-cut and to agree with those of Dr. Mathew, which served to check the specificity of their proteus strains. In the case of the animals, only one had a titre of more than 1 in 125, and this agglutination was obtained in a *Culmorum* rat infected with leptospiræ. It had been noted, however, that serum from patients with leptospirosis sometimes agglutinated the OXK strain to a titre of 1 in 480, and this same phenomenon might well be represented in the rat. A number of low titre agglutinations were obtained, in nearly all cases with the OXK strain; this, however, was not considered to be of any significance, as very similar low titre agglutinations were obtained with sera from white laboratory rats. Agglutination tests in rats and bandicoots failed to detect any rat infection with typhus virus.

An attempt had been made at Cairns, the authors stated, to obtain typhus virus of the rural type: (a) from human patients and (b) from rats and bandicoots. Attempts were later made to isolate the virus of urban typhus from rats caught in the city of Sydney. The rural and urban types of typhus differed, not only in their probable vectors, but also in the response of laboratory animals to infection with their viruses. Evidence tended to incriminate the mite as a vector in the case of rural typhus and the flea in that of urban typhus. The authors then described the laboratory animals used in the investigations at Cairns and the manner in which the experiments were made; they stated that the results obtained had not been particularly informative.

Passing on to discuss prophylaxis, the authors stated that this could be conveniently considered under three heads: (i) active immunization of those exposed to risk; (ii) measures to be taken against the vectors and carriers of the virus; (iii) measures to prevent access of the vectors to the human host. With regard to immunization, the authors pointed out that, as no laboratory strain of rural typhus had yet been propagated, prophylactic vaccination was not possible. Moreover, in view of the possibility of recurrent attacks of the disease, the success of this measure was open to doubt. With regard to the question of vectors and carriers, the authors considered the control of rodents in cities advisable and practicable. Although evidence went to indicate the association of rural typhus with scrub country, successful measures against bush rodents were obviously impossible. The protection of the human host from vectors might be achieved by suitable methods of dressing and by the use of powdered "Derris root".

Nutritional Survey of South Australia and Queensland.

Dr. F. W. CLEMENTS (Sydney) presented a paper in which it was stated that comprehensive nutritional surveys had been conducted in the remote regions of the interior of South Australia and Queensland and to a very limited extent in the industrial areas of Sydney. Amongst the 2,634 children of all age groups examined, 453, or 17.2%, were observed to be suffering from malnutrition. Rickets was responsible for 194, or 7.4%; nutritional anemia for 120, or 7.0%; chronic sepsis (nose and throat) for 75, or 2.8%; whilst in 64 cases the causative condition was undiagnosed. The incidence of rickets in infants and pre-school children was considerably higher than the figure given above, since it reached 20% about the second year.

In the infants and toddlers examined rickets was characterized by vague symptoms of loss of appetite and weight, restlessness at night, fretfulness by day and repeated catarrhal infections of the respiratory passages. Ligamentous hypotonia and moderate anemia (a hæmoglobin value of 65% to 70%) were frequent findings.

In the early stages no change was detected radiographically in the growing ends of bones, but if the condition had persisted for any length of time the zone of temporary calcification at the lower end of the radius had disappeared. The diaphysis had a streaked appearance and the diaphyseal epiphyseal line was ragged and frayed, conforming to Bromer's first stage of the passive type. It was recognized that rickets was produced by the operation of one or all of four factors.

Dr. Clements referred to the vitamin D intake which might be either by ingestion or by the action of ultra-violet light upon the skin. He pointed out that Coffin had shown that eggs and butter were the only common foods containing an appreciable amount of vitamin D and that to supply the daily requirements of this vitamin from these sources would upset the balance of the diet.

Clements and Golding had shown that the ultra-violet light component of sunlight in Sydney varied greatly with the season and time of the day. Owing to the activities of baby clinics, infants generally obtained sufficient exposure to sunlight or skylight, but not infrequently the toddler failed to receive adequate exposure. When fully clothed with only hands and feet unclothed, 15% to 18% of the surface area of the toddler (one to three years) was exposed to radiation.

As yet no estimate had been made of the minimum surface area of the body required to be irradiated to prevent rickets; but it would appear from observations made during these surveys that the arm, legs and face were ample, provided the exposure was sufficient.

An analysis of the results obtained by Chick and her co-workers in Vienna indicated the equivalent of 20 to 25 minutes' exposure to midday sun in midsummer of a child with only arms, legs and face exposed would prevent rickets. This figure varied from twenty-five minutes (mid-day midsummer) to about three hours on a dull afternoon in winter.

The average toddler tended to play very little out of doors, preferring its mother's company indoors, and consequently often failed to receive adequate exposure.

Much of the cod liver oil sold in Australia was in the form of 50% emulsion and the dose recommended was one teaspoonful three times a day. This was equivalent to six grammes of pure cod liver oil in 600 international units. American paediatricians and research workers advocated 1,000 to 1,200 international units per day of vitamin D in the form of cod liver oil to prevent rickets. Because of this discrepancy and the fact that the child frequently did not receive three doses a day, rickets often occurred in children who were taking cod liver oil.

Dr. Clements then referred to phosphate intake. He stated that Mellanby had demonstrated that a high cereal diet in puppies produced rickets and postulated "the presence of a decalcifier" in cereals. Bruce and Callow had since shown that cereals favoured the production of rickets because of the phosphates in the non-assimilable form of phytin, the calcium magnesium salt of inositol hexaphosphoric acid.

In the light of this work a reassessment of the content of available phosphates in the diet of a child one to two years of age indicated that the cereals, vegetables and eggs or fish or meat accounted for about 200 milligrammes of phosphorus per day, whereas there were 837 milligrammes of available phosphates in one and a half pints of milk.

Sherman and Hawley had shown that the daily phosphate requirement of a child of three to thirteen years was one to one and a half grains. Thus an infant failed to obtain sufficient of this mineral unless it consumed about one and a half pints of milk per day.

Dr. Clements was quite satisfied that the scarcity of milk in the interior of all the eastern States was the greatest single factor in the high incidence of rickets found to exist in his surveys.

Dr. R. WHETTENHALL (Melbourne) said that it should not be forgotten that there was a great deal of disability from exposure to sunlight, and many people developed keratosis or rodent ulcer. It was possible that people in the outback had the same fear of exposure, as they had been frequently warned by medical men of this risk.

PROFESSOR HARVEY SUTTON (Sydney) said that the question of keratosis and rodent ulcers should be seriously considered. They took many years to produce and most frequently occurred on the face and hands. This point should be stressed, but in view of this the parents should not hesitate to expose the body of the child to sunlight. There was a predominance of these pathological conditions amongst people who lived out of doors. If it was possible to make observations relating to the colour of hair and eye something might be learned in regard to resistance to sunlight.

Section of Radiology and Electrical Therapy.¹

President: J. G. Edwards, M.B., Ch.M., New South Wales.

Vice-Presidents: A. Syme Johnson, M.B., B.S., Western Australia; R. D. McIntosh, B.A., M.B., B.S., Tasmania; P. Clennell Fenwick, M.D. (N.Z.), M.B. (Lond.), F.R.C.S. (Edin.), New Zealand; John O'Sullivan, M.D., D.M.R.E., Victoria; Val. McDowall, M.B., Ch.M., Queensland; H. C. Nott, M.B., B.S., D.M.R.E., South Australia.

Secretary: H. A. McCoy, M.B., Ch.M., D.M.R.E., South Australia.

President's Address.

DR. J. G. EDWARDS (Sydney) took as the title of his presidential address "Twenty-Nine Years in X ray Work". He discussed the various pieces of apparatus in use from 1908 onwards and described the difficulties of working such apparatus with the inadequate instruments then available for measurements. The physicist and engineer later investigated the more accurate measurements of currents; and in 1915, after the invention of the Coolidge meter, the taking of X ray pictures became an exact science rather than a matter of guesswork and good luck. In 1900 the Sydney Hospital authorities inaugurated an X ray department under the control of that great Australian pioneer in radiology, Dr. Herschel Harris, and the department, known as the Skiagraphic Department, grew so rapidly that in 1907 a resident skiagraphist was appointed. In 1908 Dr. Edwards became resident skiagraphist and thus began his work in radiology.

Dr. Harris and Dr. Clendinnen, senior, were two of the early men to suffer ill-effects from the exposure to X rays; and from them Dr. Edwards learned to avoid unnecessary exposure and he had them to thank for his continued freedom from ill effects.

The early apparatus of 1908 consisted of induction coils with varying types of interrupters, from the old "dipper"

interrupter to the more elaborate centrifugal interrupter and the electrolytic interrupter. Exposure times in 1908 were fifteen seconds for an antero-posterior examination of the wrist joint to five minutes for a renal examination; by 1910 these times had been reduced to three and twenty seconds respectively.

At all stages the weak point in X ray equipment had been the tube. The early tubes, 1900 to 1912, were built with platinum targets and were quickly destroyed by high currents. In 1912 tungsten target tubes were in use and these stood much heavier currents, about forty milliamperes of current as against fifteen or twenty for the platinum tubes.

Before the introduction of the Coolidge tube in 1915, all tubes had some device for lowering the vacuum by liberating gas from special chambers, but with the Coolidge tube, the vacuum and therefore the penetration of the rays were regulated by varying the heat of the cathode filament. The modern rotating anode tube would allow of the passage of huge milliamperages while still giving excellent photographic detail.

Plates had been in general use until the end of the War, when single coated films were introduced. With plates and single films, dish development was necessary, but with the advent of the double-coated film in 1918, the modern frame and tank development system was introduced.

Intensifying screens were used in Sydney in 1912 and allowed of great reductions of exposure time. They had a very coarse grain and could not be used for cases in which great detail was essential. Owing to difficulty in

¹ The meetings of the Section of Radiology and Electrical Therapy with the Section of Medicine and the Section of Surgery, with the Section of Oto-Rhino-Laryngology and with the Section of Surgery have already been recorded.

obtaining instantaneous exposures, before 1915 practically all gastro-intestinal and thoracic work was done by fluoroscopy. The workers were very accurate in the gastro-intestinal field, but the number of early lung lesions which were missed must have been enormous. In 1908 only a few chest and intestinal plates were made, while now practically all chest work and most gastric work was done by radiography.

American makers changed from the wax insulated transformer to the oil immersed one in 1916, but the English firms did not make this necessary advance until 1921. The wax insulation was subject to many breakdowns in this climate, whereas the oil immersion sets had given little trouble.

In conclusion, Dr. Edwards referred to the present vogue of "shockproofing" apparatus which was being forced on radiologists by the manufacturers. For bedside and operating theatre, shockproofing was essential, but in large, well-conducted departments it was quite unnecessary and only added hundreds of pounds to already costly apparatus. In over a million exposures made in various Sydney hospitals no serious case of electric shock had occurred, and no case of electrocution had occurred in Australia from X ray machines.

Urography.

Dr. B. L. W. CLARKE (Brisbane), in his paper on urography, said that the earlier attempts at urography after the intravenous injection of a radio-opaque substance had not always met with success, owing to the small quantity of opaque material in the solution. There had been other disadvantages. Now the solutions were more concentrated, containing 51.5% of iodine. They were well tolerated. In Dr. Clarke's opinion, purgation was usually unnecessary before urography; but if the patient had severe constipation or was taking bismuth by mouth, a purgative such as castor oil should be given. A period of 24 hours should then elapse before X ray examination.

Dr. Clarke then described the method of preparation of the patient, the intravenous injection of radio-opaque substance and the X ray examination. He advised against general anaesthesia and the administration of morphine, as both these procedures tended to cause inhibition of renal excretion.

X ray examination might reveal failure to excrete the radio-opaque substance by one kidney or both, poor excretion by one kidney or both, or satisfactory excretion by both kidneys.

Unilateral failure of excretion might be due to a temporary inhibition following renal colic; therefore, it was advisable not to carry out urography until colic had disappeared. Unilateral failure of excretion might also be due to blockage of the ureter by a calculus at the uretero-pelvic junction or in the upper third of the ureter, or to destruction of renal tissue by neoplasm, hydro-

nephrosis, pyonephrosis or a calculus occupying the whole of the renal pelvis and calyces. Bilateral failure of excretion might be due to the action of narcotics, to chronic cardio-renal disease, or to back pressure, as in retention of urine due to prostatic hypertrophy. Poorness of excretion by both kidneys was due usually to back pressure from the bladder, or to cardio-renal disease.

In discussing the various pathological conditions that might be revealed by excretion urography, Dr. Clarke said that it was always advisable to look for changes in the bony pelvis and the lumbar vertebrae; as, for example, unsuspected secondary malignant deposits might be found. In his experience, metastases from malignant disease of the prostate appeared first in these situations.

Hydronephrosis was usually not difficult to detect by excretion urography. Information of great importance could be obtained concerning the function of the kidney, the amount of normal renal tissue and the presence of reservoirs that would subsequently become infected or be the site of calculus formation. Furthermore, the cause of the hydronephrosis might be revealed.

Acute renal or perinephric infection usually resulted in impaired excretion on the affected side, accompanied by enlargement of the renal shadow and obliteration to a varying degree of the shadow of the psoas muscle. There was no excretion from the part of the kidney affected. Neoplasm of the kidney caused varied appearances; diagnosis of the type of neoplasm was difficult and should be left to the pathologist.

Excretion urography during pregnancy revealed uniform dilatation of both ureters and also a varying degree of dilatation of the pelvis and calyces. This was probably physiological.

Very little variation from the usual technique was required in the examination of children. The dose of solution injected should be one cubic centimetre for each year of age to fifteen years, when the full dose could be given.

Dr. Clarke quoted several cases from his experience, and then proceeded to summarize the advantages of excretion urography over pyelography following retrograde injection of a radio-opaque substance. Excretion urography was a comparatively simple procedure, causing little inconvenience to the patient. It provided graphic evidence of the function of both kidneys. It was a rapid method of carrying out a complete examination of both kidneys rather than one only at a time. It localized the area for subsequent examination after retrograde injection of a radio-opaque substance. It was economical in public hospitals, as it did not necessitate the admission of patients to the wards. It was economical in private practice, as it required very little time. The radio-opaque substance itself intensified the renal shadow. The method appeared to be ideal in pregnancy. Finally, it assisted, but did not eliminate, pyelography after retrograde injection of a radio-opaque substance.

Section of Neurology and Psychiatry.¹

President: J. K. Adey, O.B.E., M.B., Ch.B., Victoria.

Vice-Presidents: H. M. North, M.B., Ch.M., D.P.M., New South Wales; S. V. Sewell, M.D., Ch.B., Victoria; John Bostock, L.R.C.P. (Lond.), M.R.C.S. (Eng.), M.B., B.S., (Lond.), D.P.M., R.C.P.S., Queensland; H. K. Fry, D.S.O., B.Sc., M.D., B.S., D.P.H., South Australia.

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President's Address.

Dr. J. K. ADEY (Melbourne), in his presidential address, said that the outlook with which a neurologist approached his patient was totally different from that of a psychiatrist. Both were interested in the central nervous system, but

there was no more reason for psychiatry to be linked with neurology than with cardiology or any other branch of medicine.

Cranial topography and surgery had advanced so rapidly in recent years that the cranial surgeon was now equal to the abdominal surgeon. Psychiatry unfortunately had not made similar progress, but during the last twenty years great advances had been made in the treatment of

¹The meetings of the Section of Neurology and Psychiatry with the Section of Oto-Rhino-Laryngology and with the Section of Ophthalmology have already been recorded.

the insane. The malarial treatment for general paralysis, and Freud's explanations of delusions were moves in the right direction. The insulin shock therapy for *dementia præcox* was too recent an advance for its value yet to be estimated; this would have to be left to the next congress.

The general physician could and did assist the psychiatrist, and the psychiatrist should be more helpful to the general physician. The out-patient department of every large hospital was haunted by patients who were ill because they were unhappy. It was difficult for a physician to realize that a disease caused by and due to a definite pathological lesion needed to be treated not from the point of view of that lesion only, but also that the state of mind of the patient, due to general unhappiness, made him particularly susceptible to bacterial invasion and even to accidents requiring surgical treatment.

A direction in which research would be profitable was an inquiry into cures by unqualified people. The medical profession shut its eyes to the fact that many unqualified practitioners got a certain number of results. It was quite useless for the profession to dismiss these with a wave of the hand and say they were charlatans and quite unworthy of a reputable practitioner. Dr. Adey did not suggest that their methods should be copied, but if some methods of charlatans had curative value, these should be subjected to proper scientific investigation and the results used in a proper manner.

Dr. Adey hoped the profession would set its face against legislation by which the public would be compulsorily driven towards health. Efforts at passing legislation for compulsorily sterilizing the unfit were premature and unwarranted. The profession should endeavour, by all means in its power, to forward legislation to promote the health of the people, provided it met with the general approval of the community; but any attempt to bully the general public into taking care of its own health would recoil on the heads of the profession by the loss of confidence of the general body of intelligent people. The function of medical practitioners was to act as medical advisers, not as medical commanders.

Dr. Adey expressed pleasure that the section was cooperating in the discussion with the Section of Ophthalmology. He felt, after attendance at each congress, that a certain amount of progress had been achieved, and closer cooperation with specialists in other branches of medicine and surgery was one advance which was being made. Every neurologist and psychiatrist should have ready access to an X ray plant and to a biochemical laboratory, and one of the most striking advances made in the last twenty years had been the closer cooperation of the psychiatrist with the general hospital.

The Small Intracranial Blood Vessels in Brain Conditions.

DR. OLIVER LATHAM (Sydney) read a paper entitled "The Role of the Small Intracranial Blood Vessels in the Pathology of Brain Conditions". He said that at his laboratory he received many brains in which but slight degrees of pathological change were evident to the naked eye, but in which serious disease of the small arterioles and capillaries was revealed by histological examination. (Edema, *status spongiosus*, and signs of prestasis and of vascular dysfunction appeared in most of these sections. It was now recognized that the last-mentioned conditions were the most important, and should be reported to the clinician. Dr. Latham went on to discuss briefly the nature and functions of these small vessels and the manner in which they became diseased, and to speak of some later concepts regarding vasomotor control and its derangement in certain conditions, not always including disease of the blood vessels themselves, by which necrotic effects, sometimes incurable, were produced in the neurones. Dr. Latham then spoke of fibrohyaline degeneration of the vessels, and proliferation and degeneration of the intima, which were sometimes accompanied by calcareous accretions; he referred to the usual appearance of these small vessels, with varying pictures of ordinary glia, mesoglia and oligoglia reactions accompanying them in such conditions as subacute, chronic and congenital syphilis, carbon monoxide poisoning, mania,

puerperal states, kidney disease, surgical shock and acute non-pustular infections. He spoke of some experimental work on animals in connexion with vascular tone, and of the value of new stains and metallic impregnations in showing up glia forms, senile plaques and new vascular fibrosis which would otherwise not be discernible. In conclusion, Dr. Latham discussed the peculiar picture of widespread brain purpura with intact small vessels, giving examples embodying many of the features. Dr. Latham illustrated his paper with a number of lantern slides of histological preparations.

DR. F. H. BEARE (Adelaide) said that Dr. Latham in his paper on small intracranial blood vessels in brain conditions had brought to the notice of the section the importance in pathogenesis of changes in the smaller blood vessels of the brain and the capillaries in particular. Dr. Latham had shown that with the naked eye many brains showed little to account for the symptoms and signs present in life. Further, he had pointed out how the newer method of histology had recovered evidence of diseased processes not recognizable by older methods. He had instanced cases in which no satisfactory explanation would have been given for the clinical picture had not the most minute histo-pathological examination been carried out. This type of work necessarily required the combination of a technician skilled in staining nervous tissue and a skilled neuropathologist, a combination unfortunately rare; and this would perhaps explain why so many problems of neurology remained unsolved. Going further, it was possible that the solution to many of these problems might be arrived at, not so much by an intensive histological study, as by a consideration of the physico-chemical processes at work. He stated that the part of Dr. Latham's paper that called for most comment was the reference to abnormal processes in the capillaries, that part of the vascular system which came most closely in contact with the functioning cell of the nervous system.

The work of Krogh had shown that the capillaries were not passive structures depending solely upon the variations of the arteriolar and venular content and pressure for changes in their lumen and in their pressure. On the wall of the capillary there lay the Rouget cell, first revealed by the newer method of vital staining, which, like the circular muscle of the arteriole, was under the control of the vegetative nervous system. Furthermore, as pointed out by Dr. Latham, unlike the capillaries of muscle, the majority of which were in quiescence at any one time, the capillaries of the brain were in the main full-time and not shift-workers; therefore, any damage done to the brain capillaries would result in earlier and more serious clinical manifestations. Many factors might influence the tone of the capillary wall; amongst them were the nervous or emotional, the chemical, and the hormonal factors, and the products of tissue destruction. Examples of these had been given by Dr. Latham, and did not need repetition. Dr. Latham, as he understood him, had stated that changes of three degrees might occur with alteration in the tone of the capillaries: (a) with slight stimuli, vascular dilatation followed by acceleration of the blood stream was obtained; (b) with stronger stimuli vasoconstriction was followed by dilatation; and (c) when the latter was accompanied by swelling of the circulation, prestasis occurred with the formation of petechiae. However, Dr. Beare understood Dr. Latham to have said that when dilatation occurred, either stasis or prestasis might come about, and when this occurred rapidly agglutination of the red cells might occur. This stasis was a temporary affair, and was not accompanied by transudation of plasma. On the other hand, prestasis was accompanied by transudation of plasma and the passage out of the vessel wall of red cells. In any case, as a result of lowered capillary tone arising from any of the possible causes enumerated, either plasma or red cells or both found their way out into the nervous tissue proper, and if the cells were large enough they would produce signs of disordered cerebral function. If these changes could occur with healthy capillaries, how much more likely were they to occur in the diseased vessels as found in the autopsies described in Dr. Latham's paper?

Finally, applying Dr. Latham's findings to clinical conditions, Dr. Beare suggested that such a process as the

above might offer an explanation for the so far unsolved problems of the pathogenesis of migraine, hypertensive attacks, and the phasic hemiplegias or monoplegias occurring in an individual already known to be suffering from advanced arteriopathic conditions. In migraine there would seem to be no constant and mechanical disorder of the blood vessels. In the hypertensive condition there would seem to be a constant background of disorder in the blood vessels; while in phasic hemiplegias or monoplegias there existed gross abnormalities in the blood vessels. Dr. Beare suggested that the escape of plasma or blood cells or both from the capillary was the constant factor in all three conditions.

DR. H. F. MAUDSLEY (Melbourne) stated that his contribution was to be purely a clinical one. He said that arteriopathic disease had been regarded rather as a refuse heap diagnosis, and he was pleased to learn from Dr. Latham's address how common it was, and that the clinical diagnosis was probably in many cases correct. There were many cases with no physical signs or mental symptoms which were designated as arteriopathic disease and the patient deteriorated physically and died, and yet the pathologist was unable to find the cause on microscopic examination of the brain. Dr. Latham had given an explanation of such cases. It was difficult to make a prognosis in such circumstances. Dr. Maudsley introduced two medico-legal aspects for these cases. Such patients went through phases of mental trouble with gross delusions, and yet they got well. Dr. Maudsley often had to give an opinion on patients who had developed persecutory ideas against relatives, and perhaps for delusional reasons the patient willed his money to some religious foundation. Perhaps the patient improved clinically, but delusions against his relations persisted. It was very difficult then to say that the patient was not of sound testamentary capacity and difficult to prevent injustice being done. The other medico-legal aspect was the question of trauma and arteriosclerosis, for head injuries precipitated symptoms in a patient with preceding evidence of arteriosclerosis of the brain. It was very difficult then to decide whether compensation was justifiable. Sometimes mild mental changes preceded an injury which merely precipitated a condition already present. Another clinical problem was the appearance of epilepsy and pupillary changes in arteriopathic patients, the clinical state then perhaps resembling general paralysis. In most cases Dr. Maudsley frequently obtained an alcoholic history.

DR. I. M. ALLEN (New Zealand) asked whether Dr. Latham had seen minor arterial changes in a group of men about fifty years of age, whose work deteriorated, who showed hysterical and neurasthenic reactions, who perhaps developed epilepsy and who died rapidly. Dr. Allen had seen what he believed to be minor changes in retinal arteries in such patients. Under the frontal lobe of a patient who was being operated on for a suprasellar tumour, Dr. Allen had seen a curious yellow gelatinous appearance. On section the surface layers were found to be intact, but the inner layer showed degeneration. The vessels he had thought to be normal, but he asked Dr. Latham whether this was associated with damage to blood vessels.

DR. LATHAM, in reply to Dr. Allen's question, stated that he had examined a number of patients who had become acutely excitable and who died quickly. In these he had invariably found the tissues swollen with fluid—*status spongiosus*—many foreign nuclei were present and the blood vessels seemed very numerous. It was difficult to obtain good sections by frozen methods. He believed that many amyloid bodies indicated defective functioning of a part, due to impairment of the circulation. The hippocampus he believed to be so often affected because of the pressure of blood on three sides.

Dr. Latham believed with Dr. Beare that many of the temporary lesions were explained by the reversibility of the changes due to vascular disease, and cited the acute phases of general paralysis. In the acute phases the brain was full of a fluid, and if the cerebro-spinal fluid was drained, a chance was provided for improvement of the

circulation and restoration of function. Such also occurred in patients with renal or arteriosclerotic disease. Improvement of the circulation through the brain improved the clinical state of these patients for a while, until for some reason the condition became irreversible or an acute fatal accident occurred.

Often the blood vessels to a part appeared normal, but increase in the number and size of the neuroglial cells near a vessel indicated that it was not fulfilling its function properly. When in some blood vessels there was hemolysis of red blood corpuscles, it was surely evidence of irreversible changes in the blood vessels of that part. Dr. Latham believed that epilepsy had its basis in blanching of an area of the brain.

Angiomatous Conditions.

DR. OLIVER LATHAM (Sydney) also read a paper entitled "Fatal Vascular Accidents in Brain and Cord: Tumours or Pathological Conditions". He described four cases in which relatively sudden death was associated with peculiar vascular states, of the spinal cord in two cases and in the other two of the brain.

Dr. Latham said that of the spinal cases the first was that of a workman whose spinal cord was found to have within it a group of thirty-eight large, unformed veins with hyaline degeneration, one having ruptures causing hematomyelia for about 2.5 centimetres (1 inch) and distorting the cord. The second spinal case was that of a wharf labourer whose cord also contained many veins, taking up half the cord's diameter; sarcomatous degeneration was also visible in this specimen, and, the condition being more chronic, ascending and descending myelin degeneration was also seen in it. Both cords had equally large veins in the pia.

The first of the two cerebral cases, Dr. Latham said, was that of a man who had had some headaches; autopsy revealed a small intracerebral hemorrhage three centimetres in diameter. Microscopic examination showed this to be due to a ruptured small cavernous angioma. The fourth case was that of a returned soldier in whose brain a cerebral cyst was found. It measured about 2.5 centimetres in diameter, and on histological examination had the appearance of an ependyma, but it rested on a vein-like wall. The surrounding brain substance had degenerated, and the neighbouring blood vessels were remarkably large capillaries, 0.2 millimetre in width, with but a single row of swollen cells and little visible fibrous coat. Sometimes these vessels ran in twos and fours, suggesting folding; other capillaries had scarcely any lumen. The condition of the brain suggested a vascular catastrophe, but whether this was associated with the cyst or with some accompanying infective state was not certain.

Spinal Arachnoiditis.

DR. E. GRAEME ROBERTSON (Melbourne) read a paper entitled "Spinal Arachnoiditis". He said that in 1909 Sir Victor Horsley had described "spinal arachnoiditis"; he had pointed out the resemblance of the clinical picture to that of spinal tumours, but had held that certain minutiae often indicated the correct diagnosis. His operative results were extremely good. The pathology and aetiology, Dr. Robertson said, were obscure; trauma, syphilis, gonorrhoea, meningitis and systemic infections had been described as the antecedents. Adhesions of varying number and density compressed, or caused ischaemia of, the spinal cord and nerve roots. The adhesions might partition the sub-arachnoid space, or they might cause loculation of fluid.

Dr. Robertson then described several cases. The first patient, he said, commenced to notice pain at the back of her neck when straining. Two months later, five weeks before operation, she experienced severe pain and stiffness at the back of the neck, which were induced by her assuming the erect posture and relieved by her lying down. Three weeks later she felt severe frontal headache when supine. The deep reflexes were exaggerated and the right plantar response was indefinite. There was a spinal block, the cerebro-spinal fluid being slightly yellow and highly proteinous. Dr. Trumble divided a complete membranous partition across the subarachnoid space at the level of the second cervical vertebra. The patient had been well since.

Ten months before operation the second patient had suffered from headache and from pains radiating from the neck down the left arm; the arms became weak. Examination revealed wasting and weakness of the muscles supplied by the fourth cervical to the first dorsal segments, with corresponding diminution of reflexes. Hypalgesia was present from the fourth to the eighth dorsal segment, and the pyramidal tracts were slightly involved. There was an incomplete spinal block. Lipiodol after injection was held up in a scattered fashion in the cervical region. Dr. Coates freed the nerve roots by dividing a number of adhesions. The power of the patient's arms had returned and the wasting had disappeared.

Dr. Robertson next described a patient who for fifteen years had occasionally noticed a raw feeling along the upper border of the right trapezius muscle. For twelve months he had experienced, when standing, burning pains across the abdomen. Examination revealed hypalgesia over the upper seven right cervical dermatomes and from the fifth to the ninth dorsal segments, with corresponding diminution of the superficial and deep reflexes. After injection several collections of lipiodol remained indefinitely in the dorsal region. Treatment with deep X ray therapy gave relief of pain, but had no influence upon the underlying condition.

The condition of the fourth patient, Dr. Robertson said, had suggested amyotrophic lateral sclerosis, but pain in the neck and a diminution of sensation led to investigation. Lipiodol after injection was retained in several collections in the cervical and dorsal regions.

The fifth patient had had sudden acute pains in the lower limbs, with retention of urine and progressive weakness of the lower limbs, accompanied by wasting and absent reflexes. The cerebro-spinal fluid contained 0.4% total protein. Lipiodol after injection was held up between the fourth and fifth lumbar vertebrae. Dr. Upjohn divided arachnoidal adhesions between the roots of the *cauda equina*. The patient was able to walk, and had regained control of micturition. Apparently the arachnoiditis was secondary to neuritis of the *cauda equina*.

In conclusion, Dr. Robertson said that in each case the condition found at operation was typical of arachnoiditis. Injections of lipiodol revealed an abnormality of the sub-arachnoid space in each instance, although in only two patients did Quickenstedt's test indicate a spinal block. Dr. Robertson emphasized the importance in diagnosis of pain of burning character distributed over wide areas.

Dr. I. M. ALLEN (New Zealand) said that arachnoiditis had five sites of election: over the cerebral cortex, in the optic chiasma, in the cerebello-pontine angle, in the *cisterna magna* and over the spinal cord. But little was known of the changes in these regions, and it was necessary to study all types to obtain information about any one particular site. Although only 150 instances were recorded in the literature, he agreed with Dr. Robertson that the condition was frequent. An important group, following directly on war injuries, particularly those involving the spine, had been described by Maass and Kruger in 1918. On naked eye examination the dura was seen to be distended, there was an absence of pulsation, and upon incision very free escape of cerebro-spinal fluid occurred. Sometimes strands or sheets of tissue partitioned the subarachnoid space, sometimes cysts formed, sometimes roots were matted by adhesions, sometimes the cord was pulled to one side. The surface of the cord was congested and small vessels were seen to be distended. When the membranes were separated from the cord, this distension disappeared, and this, Dr. Allen suggested, was the most important factor in the production of the symptoms.

Dr. Allen was interested that Dr. Robertson saw his patients so early. The usual duration of the cases when first seen was from two to twenty-two years. Attention was drawn to the condition by two groups of symptoms: (i) Increasing weakness of one lower limb, with increased reflexes, and afterwards involvement of the other limb. In such cases he believed that reflex flexion of the lower limbs was more easily induced than any other type of lesion of the spinal cord. (ii) Involvement of the spinal roots, the sensory much before the motor. Sometimes both these

groups were associated. The long sensory tracks were but little involved. Occasionally the disease presented itself with progressive involvement of the lower motor neurones in one or both lower limbs. The sensory defect due to root involvement was, he said, characteristic in that several segments were involved; sometimes one form of sensation was more involved than another, and the anaesthesia shaded gradually into normal sensation. There was often swelling and vascular dilatation over these areas.

The histological picture remained rather indefinite and there had been little evidence of inflammation in the tissue previously examined. When the membrane was thicker Dr. Allen had seen changes similar to those described by Davis and Haven in cisternal cases—all stages of fibrous tissue formation, or a hyperplastic reaction of arachnoid cells. Dr. Allen concluded that the condition was a reaction for injury in its widest sense—trauma or infection. He suggested that every patient should be examined with great attention to detail and that everything unusual in the history, examination, operation or pathological study should be described so that a complete knowledge of the disease could be built up.

Dr. L. B. COX (Melbourne) wondered whether some cases of arachnoiditis had their basis in a pathological condition in the spinal cord. He recalled the case of a woman of twenty-seven who seven years before had constantly lost the power of her lower limbs and who developed anaesthesia over the lower limbs and buttocks. She had apparently recovered from this, but suffered from pains down the arms. Six years later she awakened one morning with loss of the use of her lower limbs, which became anaesthetic. A diagnosis of a disseminated involvement of the spinal cord was made. A yellow fluid was withdrawn by lumbar puncture, and there was no spinal block. Lipiodol was held up in a scattered fashion with the largest collection over the seventh thoracic vertebra. She died shortly afterwards, and a thickening of the meninges over the whole length of the spinal cord was found with arachnoiditis in the region where the lipiodol was held up. Beneath this region there were two syringomyelic cavities and above these an intramedullary spinal tumour. He would, therefore, be very suspicious of a case in which improvement did not occur after operation.

Dr. B. HUNT (Perth) stated that he had recently had under his care a woman of sixty-six with spastic paralysis and a feeling of compression around the abdomen. Lipiodol, after injection, was held up in a scattered fashion over about six segments, but chiefly between the seventh and eighth thoracic vertebrae. Over a period of two to three weeks she developed three crops of herpetic eruptions over the ninth thoracic to the second lumbar dermatomes; within twenty-four hours of operation she developed another crop of half a dozen vesicles. This he believed to be a unique case.

Dr. JOHN WILLIAMS (Melbourne) asked a question as to prognosis. He had with difficulty induced a surgeon to operate on a patient, and at operation extensive adhesion had been seen, and it was not considered advisable to divide these adhesions on account of their extent and the possibility of reformation.

Dr. Robertson, in reply to Dr. Williams's questions as to prognosis, stated that in the published cases the results had been bad when the condition had been of long standing, disseminated over a wide area, and when there were changes in the spinal cord. He believed that prognosis was poor when the roots of the *cauda equina* were intimately matted over a wide distribution.

He believed that the association with herpes was probably fortuitous. *Herpes zoster* occurred in association with a number of conditions in which the sensory roots were involved, and he instanced its frequency after injection of the Gasserian ganglion, or section of the sensory root of the fifth cranial nerve. The infection appeared to blossom out upon areas of diminished local resistance.

Dr. Cox's case, he believed, indicated that conditions within the spinal cord should be added to aetiological factors in the disease and was a further reason for Dr. Allen's contention that an understanding of the disease would be built up from the many such observances.

The Origin and Treatment of Syringomyelic Cavities.

DR. LEONARD COX (Melbourne) read a paper dealing with the origin and treatment of syringomyelic cavities. He suggested that the glial tissue associated with syringomyelia was derived from the ependymal zone of the developing spinal cord. He described a case in which two separate undistended slits (one cervico-thoracic and one lumbo-sacral) were found at autopsy. Death was caused through a large upper cervical intramedullary astrocytoma. The slits were of an identical, organoid appearance, the walls containing polar neuroglial cells set vertical to the plane of the walls of the cavities. These cells probably were derived from a portion of the developing ependymal zone of the cord which had become isolated and had undergone independent maturity.

Dr. Cox briefly discussed the relation of these heterotopic formations to the gliosis usually seen in syringomyelia. He said that it was notable that the tumour of the upper cord contained cells similar to those present in the walls of the cavities. Their origin was probably identical. A similar type of cell might be seen in the common tumour of ependymal origin.

Although all types of syringomyelia might not be derived from distension of slits, as Dr. Cox had described, the cavities might result from degeneration occurring within an area of gliosis originating from the ependymal zone of the embryonic cord. Even in the portion of cord lying between the slits in the case described an abnormal gliosis of the dorsal part of the cord was present.

Dr. Cox pointed out that the problem of the treatment of the syringomyelic cavity was twofold: the control of the glial proliferation and the drainage of the cavity. The rate of growth of the wall might vary from that of a heterotopia to that of a malignant tumour. X ray therapy had usually proved disappointing. The type of tissue was unfavourable for radiation, and as yet no satisfactory means of controlling the glial overgrowth was known.

The operation of evacuation of the cavities had now been performed in a moderate number of cases in different countries. Its results had not been uniformly good. Nevertheless it might temporarily arrest the progress of a rapidly advancing case. Dr. Cox described two such cases, in which the operation had been performed by Dr. H. C. Trumble. One patient after twelve months was still benefiting; the condition of the other improved remarkably for six months and then regressed. Further operation showed the cavity to have sealed over and to have become redistended. Improvement occurred slowly after the second operation, in which an attempt was made to establish permanent drainage into the subarachnoid space by means of a rubber tube. The real problem was to devise some satisfactory method of drainage of the cavity.

It was thought that operation was likely to benefit or arrest only in that case in which progression was occurring through distension of the cavity. It was thought unlikely to be of advantage in mild, non-progressive or far-advanced cases.

DR. R. T. BINNS (Adelaide) said that he had seen only two cases of syringomyelia in the last few years, and in neither instance had the patient come to autopsy. He had, moreover, been unable to obtain any pathological specimens of the condition in the Adelaide Hospital museums. He thought that if spinal cords were examined as a routine, syringomyelic lesions would be found more often. Dr. Cox had described the pathological appearance of the gliosis in the posterior part of the spinal cord with the formation of cavities which apparently began as "slits" that became distended with fluid. The formation of the cavities and the compression of the tissues of the cord gave rise to the symptoms and signs of the disease. The gliosis appeared to result from the imperfect closure of the folds of the primary medullary groove. The ependymal or ependymoblastic cells which were included in the imperfect fusion might proliferate and give rise to the formation of new glial tissue. According to this view, the disease was a newgrowth, the centre of which in some way became cystic and filled with fluid. It appeared that the histological appearance of the gliosis resembled but was quite distinguishable from astrocytoma.

Dr. Binns referred to an article by MacKay and Favill, who described three types of syringomyelia. These were: (a) a simple gliosis type; (b) a degenerate sclerotic type, in which a collective tissue reaction accompanied the gliosis; (c) a gliosis associated with an intramedullary tumour. Ependymomata, hamangioblastomata, medulloblastomata, oligodendrogliomata, also teratomata and astrocytomata, were associated with gliosis.

Dr. Binns also pointed out that Worster-Drought and others had reported a case in which there were associated multiple intracranial meningeal tumours, cerebello-pontine angle tumours, both neurofibromata and meningiomata, a root neurofibromata, occasional groups of subependymal cells, intramedullary neurofibromata, astrocytomata and ependymal reactions, as well as syringomyelia activities and other histo-pathological changes. The pathological findings were therefore as diverse as were the clinical types. Dr. Cox had mentioned mild cases which required no treatment, and rapidly advancing cases in which surgical operation might be performed. Dr. Binns concluded by stating that the problems of treatment by irradiation were those of the treatment of other tumours of the central nervous system.

DR. LEONARD C. LINDON (Adelaide) stated that he had had personal experience of only one case, that of a patient of thirty who had all the symptoms to be expected from a tumour at the level of the ninth thoracic segment, a clear-cut upper level of anaesthesia and palsy. Yet the patient's tumour, to his knowledge, extended up as far as the fourth cervical segment and down to the *conus medullaris*. The dorsal lamina was represented by tissue one millimetre in thickness, and a little finger could be inserted into the cavity. The fluid in the cyst was under the same pressure as the cerebro-spinal fluid. He incised the cord in the mid-line to the full extent allowed by the laminectomy and everted the edges by suturing them to the region of the denticulate ligament. The patient's condition had not improved to any great extent, but it was very difficult to see how it could. When examined at a recent date, she had good movement of the lower limbs, but there was anaesthesia of all types, and especially was she lacking in appreciation of the position and movement of her lower limbs. She was extremely ataxic, but had recovered some sphincteric function. Dr. Lindon had since found a warning by Elsberg to leave unoperated upon a patient in whom rapid deterioration occurred when the syringomyelia simulated a tumour of the spinal cord.

DR. H. F. MAUDSLEY (Melbourne) said that a young woman had presented herself with symptoms suggesting syringomyelia of fairly rapid onset. A short time before she had fallen onto her back. The symptoms progressed rapidly and at *post mortem* examination there was found to be a hæmorrhage extending through the whole length of the spinal cord. He had no doubt that a hæmorrhage due to the accident had occurred into a congenital slit.

DR. O. LATHAM (Sydney) asked whether cases of hæmorrhage developing on a basis of softening rather than tumour could be improved by physical methods of improving the circulation. He remembered having seen a spongioblastoma, the centre of which had broken down, forming a cyst in the spinal cord.

Dr. Cox, in reply, stated that in the first patient he had described there was no area of the spinal cord which could be described as being normal. The cells surrounding the slit closely resembled the cells characteristic of the ependymoblastoma of Bailey. He said that Dr. Maudsley would be interested to know that seven years before the onset of symptoms this patient had fallen on her back and was in hospital for some time with anaesthesia and weakness of limbs, which cleared up, leaving only a few odd symptoms. It was possible that a hæmorrhage occurred into a slit at this stage.

The Multiplicity of the Encephalitides.

DR. E. WESTON HURST (Adelaide) read a paper on the multiplicity of the encephalitides. He said that within the extensive group of true and so-called encephalitides recent researches had been especially productive in

revealing morbid states due to the activity of one or other filtrable virus. Already at least twenty-four different viruses had been shown to be neurotropic in man and animals; seven of these frequently caused sporadic or epidemic illness in man, while others were less common excitants of human encephalomyelitis.

Dr. Hurst considered briefly the characteristics of some of the recently discovered neurotropic virus infections. He then laid stress on the importance of a more universal application of suitable diagnostic tests in cases of obscure nervous illness.

Dr. Hurst pointed out that recent years had seen also the appearance in relatively large numbers of cases of encephalopathy following vaccination, smallpox, measles, and so on. The lesions consisted in primary demyelination of perivascular distribution, and had something in common with those of disseminated sclerosis, Schilder's encephalitis and other demyelinating maladies. At the moment the exact cause of all was obscure.

DR. F. S. HONE (Adelaide) opened the discussion from the clinical side. He said that Dr. Hurst had limited his discussion to those cases in which there was either proof of a virus being the causative factor, or in which there were reasonable grounds for believing this to be the case. He had not gone so far as Hadfield and Garrod, who had stated that the term encephalitis had come to denote an inflammation of the brain other than that which might be produced by pyogenic or other recognizable bacteria, but he had indicated in his introductory remarks that such conditions might rightly be called encephalitis.

What he understood from Dr. Hurst's paper, Dr. Hone said, was that in this class of infections of the nervous system, supposed to be due to viruses, the infection spread through the neurones throughout the whole extent of the nervous system. This conception of the spread being by the neurones rather than by the blood stream had altered the conception of the pathogenesis of poliomyelitis, modifications in the methods of treatment being a consequence. The picture was thus of a generalized encephalomyelitis, as opposed to localized encephalitis or myelitis, or neuritis from other causes. Dr. Hone then spoke of the abuse of the term "encephalitis", which was often used as a convenient classification for totally different conditions; and he deplored the lack of and the absence of facilities for intensive study of this condition, which would make it possible to take into account the causal factor in each case. He feared that it would be long before the time when a large proportion of cases of these virus diseases of the central nervous system would be diagnosed from a characteristic symptomatology. He realized the difficulties that would be encountered in differentiating the different types of encephalitis on clinical evidence alone.

Grossly different conditions, such as *herpes zoster* and Schilder's disease, Dr. Hone said, were already recognized clinically, but in these the ill-effect of the virus was localized to a particular part of the nervous system; closer clinical observation might gradually extend the range of these cases, although in the majority of these diverse infections the condition was a diffuse encephalomyelitis, which in different patients would cause damage in different tracts of the nervous system. It was only as knowledge of a moderate number of cases was accumulated that it would be possible to establish the differential diagnosis of encephalitis, and in view of the diversity of symptoms in previous epidemics the clinical tendency was to classify any doubtful case under the heading of *encephalitis lethargica* when any gross epidemic was in existence. Dr. Hone wondered whether, in view of the extreme difficulty of diagnosis, every opportunity should not be taken to investigate by animal inoculation the possible virus causing such symptoms, so that gradually a series might be built up which would aid in clinical diagnosis. He said that in particular every slightly febrile patient with much headache or other cerebral symptoms should be thoroughly investigated, in view of these symptoms being the precursors of otherwise unexplained cases of disseminated sclerosis or Parkinsonism in later years. Patients with pleocytosis in the cerebro-spinal fluid, giving no reaction to the Wassermann test, should be tested by

animal inoculation; with close cooperation between medical practitioners and pathologists viruses might be recovered in these sporadic cases, which could be shown to give rise to epidemics. Dr. Hone reminded members of the curious sporadic cases of poliomyelitis that occurred every year, and pointed out that during recent years these cases had been recognized more often simply because the possibility of their occurring was borne in mind; he quoted several cases from his own experience. Dr. Hone concluded by calling attention to the possible variety of manifestations of the same causal virus, and the possible similarity of manifestations from a variety of causal factors; he urged that members should respond to Dr. Hurst's request and seek the causal factor in all cases.

DR. ERIC COOPER (Melbourne) stated that there had recently been an epidemic of cat distemper with neurological symptoms. He asked Dr. Hurst whether this was due to the same virus as dog distemper.

Dr. Hurst replied that dog distemper affected only canines and ferrets, and was a different disease from cat distemper.

DR. LEONARD C. LINDON (Adelaide) asked how to obtain specimens at autopsy suitable for culture.

Dr. Hurst replied that the corpse was treated as a living subject during the surgical operation, the instruments being boiled and the skin sterilized. The time for the *post mortem* examination was immaterial unless the patient died of septicæmia. The brain and cord remained sterile for twenty-four hours.

DR. THOROLD GRANT (Adelaide) had recently under his care at the Children's Hospital a boy of ten years with a disease which he diagnosed as encephalomyelitis. The boy appeared to be in *extremis*, but next morning he found the patient sitting up in bed reading a comic paper, the temperature having subsided by crisis. He asked had Dr. Weston Hurst had any explanation of this phenomenon.

Dr. Hurst stated that this was typical of this type of disease. At night a fatal prognosis might be given, and next morning the child was found to be eating breakfast. He had no doubt that if an examination was possible at this stage, perivascular demyelination would be found. In this disease the axones were affected last. If oedema and other transitory changes disappeared, then the essential nervous tissue would carry on with its functions.

DR. O. LATHAM (Sydney) said that he had examined a case of encephalomyelitis in a child who was suffering from scarlet fever. The changes had been most pronounced in the floor of the fourth ventricle and so produced death at an early stage.

DR. LEONARD COX (Melbourne) had seen since the commencement of the epidemic of poliomyelitis a case of encephalomyelitis in Melbourne, several cases of acute disseminated sclerosis, a case of *neuromyelitis optica*, and a case of papilloedema without raised intracranial pressure. He asked whether there was any connexion between these diseases.

Dr. Hurst stated that he was unable to say whether there was any connexion.

DR. ALLAN WALKER (Sydney) asked for sympathy for the clinician. It had been very difficult for the consultant to gather all-important information on these cases, and he doubted whether the incomplete information obtained was not rather confusing instead of helpful from a scientific point of view. He had seen several patients with raised temperature, violent headache, photophobia, ataxia and excruciating neuritic pains, which cleared up, but who were seen under conditions which made even clinical investigation difficult. A patient who had been thought to have typhus, developed signs suggesting encephalomyelitis. He asked whether anything could be gained by collecting cases with vague symptoms and recording them, perhaps under incorrect designations.

Dr. Hurst agreed that when the pathological basis was certain a clinical diagnosis might be possible, when it emerged that some clinical picture was associated with a particular virus. The first steps lay with the pathologist in these cases.

DR. H. F. MAUDSLEY (Melbourne) asked whether there was evidence of virus infection in chronic *encephalitis lethargica*—the chronic progressive disease after the acute phase had subsided. He agreed with Dr. Cox that there were a great number of cases in Melbourne of acute disseminated sclerosis, so acute that diagnosis of *encephalomyelitis* was made. Only later, when the acute symptoms subsided and the case ran a clinical course of disseminated sclerosis, did the real diagnosis become apparent.

Dr. Hurst believed that the virus in *encephalitis lethargica* had never been isolated. In virus diseases no virus was known which could persist and produce manifestations over many years. This, therefore, was one of the many unsolved problems in connexion with virus diseases.

Tuberculous Meningitis in Children.

DR. EDGAR STEPHEN (Sydney) read a paper entitled "Tuberculous Meningitis in Children". He said that some idea of the relative frequency of occurrence of tuberculous meningitis might be gained from the figures that he would proceed to quote. In two years at the Royal Alexandra Hospital for Children 306 patients with tuberculous disease were admitted; 39 of these were suffering from obviously medical conditions, 51 were patients with diseases of a more general type, such as affections of the lymphatic system, and the balance (216) were suffering from surgical conditions.

Dr. Stephen said that among the 39 medical cases 27 patients had tuberculous meningitis, and he gave an analysis of another 37 patients with tuberculous meningitis examined within the previous three years. Seventeen of these patients were less than two years of age, nine were between the ages of two and four years, and eleven were more than four years of age; 16 were males and 21 were females. Examination of the clinical histories revealed marked variation in the frequency of certain symptoms and in the intensity of such symptoms. Ten patients complained of headache and eighteen of vomiting; seventeen patients had convulsions and sixteen had paralysis; spasticity was present in ten patients, and in eighteen Kernig's sign and neck stiffness characterized by the spine sign were present. The average daily temperatures were 38.6° C. (101.6° F.) and under in 26 cases and over 38.6° C. in seven cases; the pulse rate was 136 and over in 19 cases and under 136 in 14 cases; the respiration rate was in the region of 40 per minute. Dr. Stephen pointed out that a rather lower pulse rate and lower respiratory rate would have been expected.

Discussing the seasonal incidence of tuberculous meningitis, Dr. Stephen said that 25 of these 37 patients were admitted to hospital in the latter half of the year. This was in accordance with the experience in other countries, and was probably due to the fact that spring and early summer were the times when respiratory diseases were most common. They probably excited an active tuberculous process. The average duration of recognized illness was twenty days. The shortest duration was seven days and the longest was thirty-eight days. In the record of previous health the occurrence of pertussis was noted in nine instances. Nine patients had a family history of tuberculosis, but Dr. Stephen said that if a more searching and purposeful inquiry had been made this figure would certainly have been vastly altered.

Dr. Stephen then spoke of the pathological tests that had been made. He said that blood counts had revealed the leucocytes to number over 17,000 per cubic millimetre in five instances and under 17,000 per cubic millimetre in ten instances. The von Pirquet test had been performed in only four cases; three patients did not react, and one patient gave a positive reaction. Examination of the cerebro-spinal fluid revealed a characteristically pronounced excess of globulin. The chlorides had diminished to 680 milligrammes per centum, and the cells numbered 200, being mainly lymphocytes.

Tuberculous meningitis, Dr. Stephen said, was a disease with a short history. For two or three weeks the child, usually under three years of age, was not himself; he tired easily and lost interest in playing, his appetite

becoming capricious; next came drowsiness (with irritability if the child was disturbed), stiff neck muscles, irregularity of respiration and the development of paralysis of the eye muscles. Characteristic changes in the cerebro-spinal fluid took place. The illness was of five weeks' duration. The onset was insidious; headache, vomiting and obstinate constipation were suggestive syndromes. The stage of irritability followed, the fontanelle being tense and the breathing irregular. Slowness of the pulse was not so common as was generally stated. The paralytic stage, with fine tremors of the limbs, convulsions and sweating, in addition to paralysis and coma, was the final stage. Tubercles might be revealed on the chorioid by expert ophthalmoscopic examination.

In conclusion, Dr. Stephen said that in the matter of treatment in most cases infrequent lumbar puncture was sufficient; there was no advantage in performing this small operation repeatedly. The patient soon drifted into an oblivion, which attendants should respect and preserve. Hypodermic injections of morphine, chloral draughts and "Phenazone" were suitable sedatives. Rectal medication with a 50% solution of magnesium sulphate was seldom indicated.

DR. E. BRITTEN JONES (Adelaide), in opening the discussion, stated that chorioidal tubercles were not infrequent in tuberculous meningitis, and it had been possible in three cases to diagnose an otherwise obscure illness on this sign alone. Chorioidal tubercles had been seen in fifteen cases at the Adelaide Children's Hospital; 66% of the patients with miliary tuberculosis and 27% of patients with tuberculous meningitis showed such tubercles. These facts were rather evidence in favour of a blood-borne infection. At the Children's Hospital a Mantoux test had been done in all cases and a positive reaction was obtained in over 90% with the intradermal, in contrast with the scratch test. In two cases Dr. Britten Jones had seen the following sequence: the child who had a positive Mantoux reaction, indicating that he had had active tuberculosis at some time, developed measles, then *erythema nodosum* and then tuberculous meningitis, the course from measles to meningitis occurring within three months. He deduced that there was apparently some alteration in the immunity reactions following the measles which explained the development of *erythema nodosum* and tuberculous meningitis. He considered that the development of *erythema nodosum* in a child who had a positive Mantoux reaction was the "writing on the wall". He agreed with Dr. Stephen that irregular and frequent sighing respirations were very important clinical signs.

DR. THOROLD GRANT (Adelaide) remarked that chorioidal tubercles were by no means infrequently seen if the *fundus oculi* was carefully examined. The careful investigation of the family history of his patients nearly always revealed intimate contact with a case of known or suspected pulmonary tuberculosis. He believed that a strongly positive result to an intradermal tuberculin test in a young child meant an active tuberculous lesion and was present in a large percentage of patients with tuberculous meningitis. He asked whether a positive reaction to the tryptophane test was a reliable diagnostic indication.

DR. O. LATHAM (Sydney) asked that the whole brain should be sent to a pathologist when an examination was desired. Small pieces were useless. Sometimes the pia arachnoid was infiltrated with large cells, but this was not specific, and without sufficient material diagnosis could not be accurate. Such a reaction was seen when typical tubercles were present in the base.

DR. ERIC COOPER (Melbourne) said that in a series of one hundred cases of miliary tuberculosis, in forty of which the meninges were involved, recovery had occurred. The evidence for the diagnosis of miliary tuberculosis was the finding of tubercle bacilli in the cerebro-spinal fluid, chorioidal tubercle or X ray evidence of involvement of the lungs. He believed that there was evidence that recovery could sometimes occur, especially when a tuberculoma ruptured into the subarachnoid space. He believed that the observation of *erythema nodosum* in a patient who had already been infected was of great importance,

for it was usually taken as evidence of a primary tuberculous infection.

DR. STEPHEN, in reply, stated that he was pleased to hear that the picture was not so black as he had painted it, but he would be surprised if any patient under his care recovered. In the Children's Hospital the residents had insufficient time to obtain an adequate family history, but whenever he had gone into the question personally, contact with a case of open tuberculosis was found. The cerebro-spinal fluid gave such diagnostic assistance that other investigations could be omitted, but he would in future insist upon a Mantoux test being made and the chorioid examined for tubercles. He had no experience of the tryptophan test.

Psychiatry of the School Period.

DR. H. M. NORTH (Sydney) read a paper entitled "Psychiatry of the School Period". He emphasized the importance of distinguishing between mental dulness and retardation. Dulness was a condition of poverty of intelligence not amounting to mental deficiency, while retardation implied a mental development that lagged conspicuously behind innate potentialities. Retardation might occur in mental defectives and dullards and in average, superior and gifted children; it might be general or relative in its incidence. When diagnosed, it was amenable to treatment, and adequate handling of scholastic retardation was regarded as an important prophylactic measure against later delinquency.

Dr. North next dealt with nervousness and behaviour disorders. He discussed the part played by the sympathetic induction of emotions in the infant, and with the functional disturbances that might be so caused. Individuals of tender years were especially susceptible to emotional contagion from their elders; thus a toddler might approach a threatening animal without fear, until his mother had communicated her alarm. Fear or other depressing emotions might be needlessly communicated by over-anxious or worrying parents. Emotional reactions were accompanied by more severe visceral disturbances in the child than in the adult, and if too much attention was paid to such disturbances he might unwittingly be trained in habits of invalidism, especially if he derived satisfaction in some other direction from this excessive care; this process was called "adaptation by illness".

In introducing the subject of delinquency, Dr. North adopted McDougall's teaching regarding the development of the moral sentiments and character. He pointed out that such development depended to a certain extent on environment, and therefore had to be regarded as an acquired mental structure; but it depended also on innate mental dispositions, since there were vast individual differences in the capacity to acquire sentiments even in the same environment. The moral imbecile was capable of forming only the crudest sentiments, so that his conduct, depending on the impulse of the moment, could not be calculated.

Much association with adults was regarded as inimical to the formation of valuable sentiments, the child needing the companionship on equal terms of others of his own age and sex. The difficulties created in modern society by the small size of families and by the growth of flat life might be met by the provision of kindergartens, of organized playgrounds and of boys' and girls' clubs *et cetera*.

DR. JOHN WILLIAMS (Melbourne) in opening the discussion, congratulated Dr. North on his effort to deal with such a large subject in so short a time. He agreed that there was need for more exactitude of terminology as regards mental defectiveness, dulness and retardation, but emphasized the difficulties in deciding the degree of retardation associated with mental deficiency or normal ability, and expressed some doubt as to the reliability of intelligence tests in this regard. Considerable variation in the results of tests, sometimes over quite short periods with the same tester and with no apparent cause, showed that they were not to be regarded as certain indications of the innate mental ability. The dependence of the child on its environment and the influence of McDougall's primitive passive sympathy had been emphasized; and there

seemed little doubt that the nervous child of nervous parents was at least as much a victim of environment as of heredity, and that if he was taken in hand at an early stage neurotic tendencies were reversible. The delimitation of school age was becoming very difficult, and there was little doubt that many personality characteristics were already firmly built in the child of six years. There was considerable evidence that the wide spread of nursery schools and kindergartens would go far to correct the unhealthy tendencies often built in at home. Care in the choice and training of nursery school helpers was, however, necessary, as harm might easily result if the nursery school was regarded merely as a school in miniature, instead of as the first introduction of the child to a social community outside the home by the medium of play materials, companionship and freedom. The close touch between the nursery school and the home was also of assistance in giving the parents greater insight into the possibilities of better development. Dr. North had mentioned the possible rôle of the "costive guardian" and the passive obedience of the very good child in giving rise to schizophrenia in later life; and it seemed that there were great possibilities in the way of preventing nervous and mental disorders by attention to mental hygiene in the early years. This was as yet unproved, but so was the concept of an inherited taint that led inevitably to a later psychosis, and the former view led to a more hopeful course of action. For the same reason, Dr. Williams felt that it was a pity to assume that moral imbecility or delinquency was also inborn, and in many cases proof of this was lacking. While there was little doubt that the early years were of supreme importance in the formation of personality, considerable harm and good resulted from school education in later years, and there was need for a much wider choice of educational material and method to suit varying types of children. The path of the bright child in a class with children below him in intellectual standard was a potent cause of later delinquency and faulty habits of application. At the same time, the reverse side of the picture was emphasized to a greater extent with a dull child in a superior class.

Dr. Williams said that he would like to hear whether any of those present had succeeded in finding personality characteristics in pre-adolescent years that led to later psychosis, as his own experience in this regard had been disappointing. He felt that the diagnosis of the seeds of later psychosis was at present largely a matter of guess-work.

DR. J. K. ADIE (Melbourne) said that the subject of education of the young child provided one of the most difficult with which they had to deal. He agreed that classification of school children in regard to age was entirely wrong. The sense of inferiority engendered in the child who was in a class of more advanced children, was as harmful as the sense of intellectual boredom in a child who could acquire in a few minutes the knowledge that the remainder of the class took a much longer period to comprehend. This latter class explained the finding of an intelligence quotient of one hundred in a child who was said to be dull mentally. Often, owing to push from the parents, a child, endeavouring to push himself above his cerebral capacity as a result of a desire to excel, might reach a level above that to which his intelligence entitled him. Dr. Adie found that State school scholarships could be a potent cause of harm in unsuitable children. Some obtained a university scholarship, and had not a university brain. Educational authorities should be made to realize that something other than a capacity to pass examinations was necessary for a university career.

DR. O. LATHAM (Sydney) suggested that the criterion as to whether a child would be able to meet circumstances in the future was his capacity to be happy in everyday circumstances. There was an element of failure in the early years of a patient who failed later in life. He found that the children of teachers tended to succeed in examinations, but had not the broader capacity to adapt themselves to the tasks of life requiring more intelligence.

DR. A. M. DAVIDSON (Sydney) expressed astonishment at the way some children reproduced the qualities of the

parents; whether this was because of hereditary traits or environment he was unable to state. He stressed the dangers of coaching children and of forcing them through examinations in a state of unrest and frustration; in his opinion, coaching interfered with the attainment of university ideals. He stressed the necessity for finding in which direction talents lay and for allowing the child to develop along these lines; he also drew attention to the sense of happiness which developed when this was done.

Dr. North, in reply, endorsed Dr. Williams's remarks upon intelligence tests. He believed that the onus lay with the medical advisers to provide the child with circumstances which would allow it to succeed, or to find why the child was unable to succeed. To be told that he was dull would cause the child to evaluate himself at the standard impressed upon him by his elders and betters. The method of education should be adapted to the type of mental imagery with which the child was endowed.

A common group of backward children with high intelligence quotients were only children living with older people. The child had to be directed in everything he did; he knew, but would not accept the responsibility of committing himself unless he had an approving nod from adults. Such children improved by separating them from adults and by allowing them free intercourse with other children. Coaching was very bad for these children. The advantage of the nursery school lay in allowing children from small families to develop properly in association with children of their own age. The child of poor mental endowment did well in a primary school. A ready acceptance and memory and a glib tongue helped him. In a higher school, however, he might fall behind and develop a neurosis because he could not satisfy the expectations of his parents.

Reflex Epilepsy.

Dr. I. M. ALLEN (New Zealand) read a paper entitled "Results of the Investigation of Reflex Epilepsy". He said that reflex epilepsy was a condition in which an epileptic attack was precipitated by an individual sensory stimulus. Cases of reflex epilepsy were of considerable value in neurological investigation, because they provided in man experiments produced by disease that could be to some extent controlled.

Dr. Allen then summarized the conclusions he had reached after observation of a number of patients with reflex epilepsy. He said that attacks occurred in response to touch, pin-prick, light and sound; surprise was usually an essential factor. Knowledge that the stimulus was about to be applied prevented an attack; moreover, after the production of an attack or of a series of attacks the usual stimulus failed to produce a reaction during a period varying with the individual patient. In some patients an attack was provoked if the stimulus was applied anywhere on the body; in others the stimuli were most effective when applied to a limited area of the face, forearm and hand on one side, and were less effective when applied to the same area on the other side. Wherever the stimulus was applied the resultant local attack always began in the forefinger and thumb, or at the angle of the mouth on the right side. Stimuli were in a few cases visual and in more cases auditory; auditory stimuli had to be of the exact type in order to produce attacks. In the small group of patients with structural lesions of the cerebral cortex or of the cerebral hemisphere the area of skin in which the application of the stimulus was effective, and the type of effective stimulus when it was visual or auditory were related physiologically to the area of the cerebral cortex in which the lesion was found. Dr. Allen then described in detail the experiences of several different types of patients in the onset of an attack and while the attack was in progress.

Interpreting the observations that he had made, Dr. Allen said that it was preferable to indicate the factor which caused some patients to have fits simply as the epileptic tendency. This was an unknown factor, which produced abnormal excitability at the sensorimotor level of the cerebral cortex; the excitability appeared in waves,

at varying intervals. During these waves the patient might have epileptic attacks, or might be more liable to have them after the operation of other factors to which reference had previously been made. Below a certain threshold of abnormal cortical excitability, abnormal cortical discharge did not occur in a degree sufficient to cause attacks. The rise of excitability above this threshold and the appearance of abnormal cortical discharge expressed in the form of fits depended upon the operation of other factors in addition to that which produced the abnormal cortical excitability itself.

Dr. Allen went on to say that it was necessary in order to explain the manifestations of reflex epilepsy and to be able to comprehend as a whole the main features of the attacks and the characteristics of the patient, to regard the higher physiological levels of the brain as acting in the way he would describe. Physiologically there was in the cerebral cortex a higher level, which might be coincident with the cerebral cortex acting as a whole. Its relationship with the environment was maintained by afferent sensory channels and efferent motor channels, through the middle level itself, which was the sensorimotor level of the cerebral cortex. This higher level in addition exercised control or inhibition or entered into conflict in two directions: (a) towards the sensorimotor level, which was apt to become abnormally excitable in the presence of the epileptic tendency, and (b) towards associations at the cortical level, particularly with strong emotional tone, unacceptable to the higher level. Conditioned responses could be initiated by an association at the cortical level of sensory impulses with strong emotional tone, and became effective as a factor in the production of an epileptic fit when the association or emotional tone was excluded by the higher level. Any event or stimulus that tended to arouse the unacceptable and unacknowledged emotional tone, would release some control over the excitable sensorimotor level, and enable abnormal cortical discharge, with a resultant epileptic fit, to occur. With an event, the apparently intractable epileptic fits preceded by some fear occurred; with a stimulus, the cases of reflex epilepsy without a structural lesion of the brain, and in which the stimulus and the reflexogenic zone were limited, occurred. Reintroduction of the association to consciousness, and the acceptance of the association and its emotional tone by the higher level, resulted in the disappearance of the conditioned response, and the failure of the usual stimulus subsequently to produce an epileptic fit. In the patient with an epileptic tendency a condition of unstable balance might exist between the inhibitory effect of the higher level and the excitability of the sensorimotor level. Whether the inhibition or the excitability produced a disturbance of normal function first depended upon the readiness of the inhibition and the rapidity with which the excitability was rising. Anticipation on the part of the higher level of rising excitability or of a sudden rise in excitability in response to a new factor would either prevent the occurrence of disorderly cortical discharge, or favour the appearance, first and apparently alone, of symptoms due to the inhibition. Limited cortical discharge might occur with or without the production of symptoms, and symptoms due to inhibition might follow; symptoms due to inhibition alone might appear; or symptoms due to inhibition might be followed by those due to abnormal cortical discharge.

Dr. Allen pointed out that the inhibition appeared to operate transcortically as well as downwards over an individual system such as the motor system; it was also selective, being applied locally, generally, or both together. This fact supported the idea of fields of excitation and inhibition being present in the cortex, and also the ideas of conflict between the two fields, irradiation of both excitation and inhibition, and the final expression of the conflict between the fields in terms of one or the other, according to the balance existing between them.

Dr. Allen said that it was reasonably certain that these processes operated in the normal cerebral cortex, and that they were revealed simply through the appearance of positive or negative symptoms on account of the increased excitability of the sensorimotor level due to the epileptic tendency. In conclusion, Dr. Allen pointed out that the

various clinical expressions of the epileptic tendency might be described in terms of these processes. The way in which the mental symptoms arose was clarified by them, and the therapeutic approach to the epileptic patient was shown to be a matter of individual study, leading to treatment which might vary considerably in individual cases.

DR. E. GRAEME ROBERTSON said that Dr. Allen had mentioned the theories which Denny Brown and he (Dr. Graeme Robertson) had put forward regarding reflex epilepsy. One patient in *status epilepticus* had fits at regular intervals. For a short time before the expected onset of the fit it was possible to precipitate an attack by a variety of sensory stimuli—a loud noise or a painful stimulus. There was apparently a waxing and waning of the underlying epileptic process and a stimulus could apparently fire off an attack when the epileptic process had almost reached its threshold level for the spontaneous occurrence of an attack.

The local sign of such stimuli in some cases was probably evidence of an abnormal condition of the cortical area, just as much in the case without an obvious cortical lesion as in one with a lesion. The change was merely a more subtle one, and probably this had an association with the problem of so-called "idiopathic" and "symptomatic" epilepsy. As Hughlings Jackson stated, the brain was a sensorimotor organ, and any stimulus, endogenous or exogenous, could cause the epileptic convulsion by "firing off" cells which had stored up an excess of energy. It was difficult to differentiate between a stimulus and the emotion produced in the genesis of epilepsy. It was not unbelievable that fear, and so fright, might precipitate epilepsy. It was common to obtain a history of the fright as a precipitant of the first attack in a child. He was interested that psychoanalysis in Dr. Allen's case had produced more results in the relief of this organic condition than it did in some psychological conditions.

DR. N. A. ALBISTON (Melbourne) was especially interested in the precipitated effect of emotional factors which had their basis in the early life of the patient. He emphasized the need for taking a full history. He referred to a patient who had suffered for five years from major and minor attacks and automatism with violent behaviour. These attacks followed a period in his life when he was gravely suspected by his family of criminal behaviour. He was treated by modified analysis and suggestion, and had been free of attacks for five years.

Freud analysed the factors which he conceived were the cause of the epilepsy of Dostolevsky, and suggested that the epilepsy was due to the Oedipus complex. The actual fit, he stated, was identified with the death wish. He wished that his father was dead, and the fit was due to the chastisement of himself for wishing his father to be dead. Dr. Albiston had since found the necessary factor for the foundation of an Oedipus complex in some cases. In migraine the same psychological factors had been found to be important, and on analysis the association between the headache and emotional disturbances was revealed; when the patient realized this, the migraine disappeared.

DR. ALLEN, in reply, made it clear that he did not believe that emotional factors were the cause of the attacks. They merely sometimes caused a rise of excitability so that, with the underlying epileptic tendency, a fit was precipitated. Final treatment of each individual patient might be anything from clearing the emotional factor to the removal of cerebral trauma. Dostolevsky was twice, while in prison, paraded before a firing squad, and on the second occasion had his first fit. Dr. Allen thought that it was unnecessary to go back to infantile situations for its explanation; the fear of extinction would be enough to release control of his excitable cerebral cortex.

How Civilization Manufactures Neuroses.

DR. JOHN BOSTOCK (Brisbane) presented a paper entitled "How Civilization Manufactures Neuroses". He stated that the research he had done owed its inception to the late Dr. Frankwood Williams's book entitled "Soviet Russia Fights Neurosis"; in this the author averred that in a modern industrial democratic civilization "spiritually

crippled individuals are being turned out by the basketful", and that "were there a thousand able psychiatrists for every one that now exists, we should not touch the situation". Dr. Bostock said that whilst admittedly a psychiatrist's practice was not an accurate cross-section of the community, he considered that a survey of 200 consecutive cases would prove interesting material for testing Dr. Williams's hypothesis.

After excluding 105 of the 200 cases as being of organic origin, unclassifiable, or due to drug addiction, insomnia and manic depressive psychosis, Dr. Bostock said that he had investigated a total of 95 cases (or 47.5%) in which the chief ætiological factor in his opinion was some phase of sociological disharmony. Sex was the major element in nine cases. It was probable that, if civilization had evolved a code whereby at adulthood the mating of the sexes had been made easy, the problem of repression would not have arisen. Moreover, the stream of sex literature was having deleterious effects.

It might be argued, Dr. Bostock said, that the happiest people were those of the old-time patriarchal communities. Today families disintegrated; children went to distant places, leaving friendless survivors. In seven of his series of cases loneliness appeared to be the predisposing cause of the mental invalidism. Dr. Bostock pointed out that in other times women were trained purely in domestic work, and their goal was marriage. Today they were trained for many other occupations, and it was not surprising that they should be bored with the eventual tie. Four of Dr. Bostock's patients fitted into this category.

Modern civilization tended to encourage increasing occupational specialization. The results were cases of mental invalidism in which (a) the type of work was unsuited to the type of mind, (b) environmental difficulties occurred in the work, or (c) the work was too exacting. Dr. Bostock said that no less than 36 cases were those of occupational misfits; unfortunately the keenness of competition and the high cost of living reacted adversely on the conscientious type of individual, whereas the "happy-go-lucky" were not penalized. It was curious that the financial stringency of the depression had produced few invalids. Only in five cases could this factor be blamed, and in these the patients were elderly folk who could not hope to make good their losses. The compensation neurosis was an outstanding example of civilization's manufacture of invalidism. Three hysterics in the series owed their disability to this ætiological factor.

The artificial life in cities, the family with one and two children, produced a chain of harmful environmental factors which took their toll in the production of neurosis. Dr. Bostock said that he had classified twenty-five cases as being due to (a) faulty upbringing, (b) over-possessiveness in the parent, (c) family discord or (d) the influence of "in-laws" and step-parents. A consensus of opinion was growing which maintained that the present-day educational system was faulty. Present-day children were taught a mass of facts, but the broad problem of mental hygiene was neglected. Dr. Bostock said that six children in the series were classified as difficult children, as intelligent children misapplied, or as children in a faulty environment.

In conclusion, Dr. Bostock maintained that the effects of environment were outstanding, and they should lead to an earnest inquiry into the stability of our social order. Democratic civilization was standing at the crossroads. The present system glorified individualistic enterprise, and the defects should be overhauled if people of the present day were to survive. Dr. Bostock stressed the fact that the medical profession had very definite duties. It should become more sociologically minded, and should take a more active part in the great arena of national service. This study of nervous disorders alone indicated several lines of reform; the problems of compensation and insurance, of the over-glorification of the city, of over-taxation, of vocational guidance, of the ideal type of education, of the one-child family, of late marriages, of celibacy, of depopulation, of the weakening of home and moral ties *et cetera*, all required investigation. Dr. Bostock finally wondered whether it could be gainsaid that more research into the ætiological factors of nervous disease should be

carried out by the medical profession, in order that those basic environmental factors, which produced such serious widespread invalidism, should be discovered beyond all doubt.

DR. H. K. FRY (Adelaide), in opening the discussion, stated that although Dr. Bostock's final solution was a more active endeavour to alter the circumstances, one hundred and five of his two hundred cases failed to support this contention, for environment was a minor factor. There was a general tendency to overstress the influence of environment. This was an individualistic age, which threw more strain on the individual. When facial plaster casts were made of civilized people, sweating occurred as a result of psychological stresses. When the same process was applied to a wild aboriginal, surrounded by his fellows, no sweating resulted; he had perfect confidence that with the other members of his tribe he was all right. When the process was applied to station aborigines, who had lost confidence in the white man, sweating resulted.

At the end of the previous century many organic conditions had been called "neurosis", and with every increase in knowledge this group had become more numerous; but Dr. Fry stated that the validity of diagnosis must be improved and the public should be educated to realize that proper aid could be given in such cases. Public opinion, he said, was a generation behind the knowledge of specialists and a generation hence the public would welcome adequate aid.

Strategic Points in the Lumbar and Sacral Outflows of the Autonomic Nervous System: Sympathetic Denervation of the Lower Limbs.

DR. HUGH TRUMBLE (Melbourne) discussed the anatomy of the lumbo-sacral outflows of the autonomic nervous system from the point of view of the surgeon. He pointed out that in order to free the lower limb from sympathetic influences of central origin it sufficed in practice to divide the lumbar trunk opposite the upper border of the fourth lumbar vertebra. This procedure left most of the post-ganglionic fibres to the limb intact, which was desirable. Visceral nerve fibres were spared in large part. In order to free the distal colon from sympathetic influences of central origin, the lumbar splanchnic nerves on both sides and the fasciculi uniting the celiac ganglion with the inferior mesenteric ganglia could be divided as they converged on the inferior mesenteric ganglia. In this way the majority of the post-ganglionic visceral fibres were left intact. Dr. Trumble described the course of the pelvic colonic nerve fibres from the pelvic nerve to the colon as they occurred in certain animals and in man. He showed that some of the ascending colonic nerves ran for a certain distance in company with the hypogastric nerve in man and in some herbivorous animals. He said that these might be damaged in dividing the hypogastric nerves, unless the division was made high up near the inferior mesenteric ganglion. In discussing sympathetic denervation of the lower limb in the treatment of vascular disorders, Dr. Trumble stated that most of the tests employed in the selection of patients for operation were open to objection, and he gave his reasons for making this statement. In selecting patients he was guided by the extent of the gangrene if present, the degree of discomfort, and the ability of the patient to tolerate an operation of no great magnitude which caused very little shock. The approach to the sympathetic trunk was through a muscle-splitting incision in the flank. A short section of the trunk opposite the fourth lumbar vertebra was excised, and the grey ramus to the third lumbar nerve was divided. The whole operation could be completed in about twenty minutes. The circulation of the skin of the lower limb invariably improved, and pain was usually relieved, at least to some extent. Operation should be undertaken before the onset of gangrene, if possible.

DR. L. C. E. LINDON (Adelaide) regretted the absence of Professor Goldie; he had wished to hear and speak on Dr. Trumble's paper. He said that a surgeon at the Alfred Hospital had removed the great toe of a patient for

gangrene. The wound failed to heal and spreading cellulitis developed. Dr. Lindon performed lumbar sympathectomy and the condition healed and subsided dramatically. The patient had relief from pain. The patient later developed gangrene of the other great toe, with some redness and swelling of the foot. The immediate benefit of operation on this side was marked, but the pain persisted. The great toe had to be removed, but the wound healed rapidly. He asked Dr. Trumble the explanation of this pain before and after sympathectomy. He noticed that the pain was most intense when the foot was in a dependent position.

DR. OLIVER LATHAM (Sydney) said that he had examined the second leg of a patient which had been removed for this condition. Throughout the limb there was an extraordinary increase of fibrous tissue. There was hardly any muscle to be found, and the nerves were surrounded by intensive overgrowth of the finest fibrous tissue fibres. The nerve itself showed no degeneration. The patient was alive ten years after the second operation and was free from pain. This patient had had a child who died of pseudohypertrophic muscular dystrophy. He suggested that the pain in these cases was due to fibrous contraction upon the nerves; but if this was the explanation, he failed to see why it should be influenced by posture.

DR. A. E. COATES (Melbourne) stated that Melbourne was proud of Dr. Trumble's original work on the sympathetic system. He differed from Dr. Trumble in believing that testing the vascular reactions was an essential preliminary to operation. To estimate the vasodilatation produced over the foot as a result of sympathectomy he advised injection into the peroneal nerve. Some years previously he had found no response to this test in three patients with *thromboangiitis obliterans*, and operation in each case failed to avert amputation. The nerves were found to be thickened and oedematous, and in one case the tibial nerve was as big as the *tendo Achillis*. All veins were filled with clots. He believed that *thromboangiitis obliterans* was a self-limiting disease and therefore felt that some cases could be left alone. The pain could be relieved by division or injection with alcohol of peripheral nerves; and as he had relieved several patients for five to six years by this method, he thought it premature to subject them to operation.

Dr. Coates said that he had come to believe that open abdominal operation carried with it a measure of danger, and so he preferred the muscle-splitting incision which Dr. Trumble advocated. One patient died of peritonitis and paralytic ileus five days after the abdominal operation. This appeared to be due to a stirring-up of infection, due to the fact that the patient had had an appendiceal abscess drained some years previously. He believed that the best results of sympathectomy were obtained in dealing with viscera when the physiological ground was surer. Leaving post-ganglionic fibres was advisable in operations designed to remove the sympathetic supply from the lower limbs, and for this reason operations on the lower limbs had given better results than operations on the upper limbs.

DR. TRUMBLE, in replying to Dr. Lindon's question, stated that he did not know the cause of the pain. Inadequacy of blood supply, neuritis or constriction of the nerves by connective tissues might be causes. After division of the sympathetic supply the pain was frequently relieved, and sometimes pain recurred and it was very difficult to know what to do then. He believed that the pain had its origin in vessels, for it was increased by hanging the foot downwards. He advocated operation without preliminary testing of vascular response because he had not failed in some thirty cases to obtain a good vascular reaction after operation. The skin became warm, but gangrene was not averted in all cases. The operation was very simple and could be performed in twenty minutes; and as it produced such benefit to the patient, he believed that it should be done. He was not so happy about the results of sympathectomy in visceral diseases. Many of the patients did well at the commencement, but later became as bad as they were before operation.

Subacute Combined Degeneration of the Spinal Cord.

Dr. S. O. COWEN (Melbourne) read a paper on subacute combined degeneration of the spinal cord. He said that the general clinical features of subacute combined degeneration in Australia corresponded closely to those described by writers in Great Britain and the United States of America. Obtrusive and persistent subjective peripheral sensations almost invariably ushered in the disease; they usually took the form of numbness and pins and needles, but sometimes the sensation in the hands and feet was rather one of coldness, and occasionally the patient felt as if he were walking on stones. "Girdle" sensations had been noted only occasionally in Dr. Cowen's series of patients; lightning pains were still more uncommon, and two instances only of gastric crises had occurred. Ataxia soon became troublesome in untreated patients.

Dr. Cowen said that of the physical signs, diminution of vibration sense and impairment of discrimination between two compass points were the earliest to appear; some time later, alterations in the reflexes, superficial or deep, became apparent. Persistence of the superficial abdominal reflexes after the plantar reflexes had become extensor was characteristic, but he had not observed the high degree of excitability of the superficial reflexes which was regarded as typical by Collier and Adie. In some instances a phase of diminution of the deep reflexes in the legs had occurred without alteration in muscular tone; this was associated with extensor plantar responses, and after persisting for some months this was replaced by a condition of spasticity with hyperactivity of the tendon reflexes. These points all suggested that, though involvement of the posterior columns occurred early in the disease, the clinical picture in the later stages was dominated by the affection of the lateral columns. The tabetic form of subacute combined degeneration appeared to be very rare in Australia. Almost all these patients were suffering from some form of anaemia. Dr. Cowen stressed the point that it was not uncommon for patients suffering from anaemia to manifest nervous symptoms.

Dr. Cowen went on to say that the diagnosis of subacute combined degeneration was seldom difficult, and he mentioned certain other conditions that might have to be excluded. Although its progression was not always steady and uniform, it did not show remissions.

Discussing the question of treatment, Dr. Cowen said that the chief factor was the use of liver and liver extracts. He proposed to consider (a) the value of liver in the treatment of the established disease, and (b) its efficacy in preventing the onset of neurological complications in patients suffering from pernicious anaemia. There could no longer be any doubt, Dr. Cowen said, about the value of liver treatment for these patients; adequate liver treatment would always relieve the unpleasant subjective symptoms, and it generally had a beneficial effect on the abnormal physical signs. In recent years improved methods of administration of the active substance extracted from the whole liver and especially its parenteral use had increased the percentage of successful results. The duration of the changes in the cord had an important influence on their response to specific therapy, but there were exceptions to this rule. In order that the maximum result should be obtained, an active preparation of known potency should be given in much larger doses than were required in uncomplicated pernicious anaemia. The quantity should be sufficient to maintain the erythrocyte count at 5,000,000 or more per cubic millimetre of blood, and the haemoglobin value at 90% or more, and to keep the morphology of the erythrocytes as nearly normal as possible. Even if the blood count gave results within normal limits, the persistence of macrocytosis should be regarded as evidence that the dosage was inadequate. Dr. Cowen said that his own practice was to inject twenty cubic centimetres of "Campolon" or eight cubic centimetres of "Anhaemin" at intervals of seven to fourteen days until the blood picture was within normal limits, and then to increase the interval between injections to four weeks; the actual quantities were not reduced for at least six months. After that time, if satisfactory improvement had occurred, monthly maintenance doses of ten cubic centimetres of "Campolon" or four cubic centimetres of

"Anhaemin" were given. Dr. Cowen said that he mentioned these two proprietary preparations simply because he was familiar with them. The general opinion was that any preparation that was hematologically active would, if given in sufficient dosage, act specifically on the cord lesions. The newer extracts, such as "Anhaemin", had the advantage of being less bulky and irritating than their precursors. The use of iron and thyroid extract and of dried stomach, as well as rest and exercises to reduce disability from residual lesions, all found a place in treatment.

Dr. Cowen then said that, in his experience, when nervous complications manifested themselves in patients suffering from pernicious anaemia who were being treated with liver or liver extracts, the reason was that the amount of liver administered had not been sufficient to maintain even a normal blood picture; others had confirmed this opinion. It had been conclusively shown that the oral administration of dried stomach was equally effective in preventing subacute combined degeneration.

Speaking of the pathogenesis, Dr. Cowen said that subacute combined degeneration must in this connexion always be considered apart from pernicious anaemia. The two conditions did not always occur together. It was now clear that pernicious anaemia was caused not by toxæmia, but by the lack of a specific chemical factor necessary for the normal maturation of red cells, and would be relieved by the administration of liver or liver extract. It could be accepted that liver treatment would prevent the occurrence of nervous lesions in patients suffering from pernicious anaemia, and yet established disease of the nervous system varied in its response to specific treatment; the only solution appeared to be that nervous lesions in their earlier stages were reversible, but that they ultimately became fixed and resistant to treatment. Dr. Cowen added that this supposition was necessarily conjectural. He wondered whether the effect of a specific deficiency alone could account for the lack of parallelism in the development of the anaemia and the nervous lesions, and suggested that the variations in the clinical picture were not due to the action of several pathogenic agents, but to constitutional differences in affected individuals, which modified the responses of certain organs or systems to the action of the hurtful stimuli.

The Treatment of Trigeminal Neuralgia.

Dr. F. J. CLARK (Perth) read a paper entitled "The Treatment of Trigeminal Neuralgia". He said that he could not pretend that he had had a vast experience in trigeminal neuralgia. But he thought that this was an advantage in that it saved him from speaking with the prejudice that was almost inevitably born of long personal experience and the development of a highly specialized technique. It had been his practice to estimate the curative value of any suggested method of treatment, not in the hands of a master, but in the hands of a surgeon who was only occasionally called on to employ it. He stressed the importance of accurate diagnosis. Treatment for established trigeminal neuralgia would not as a rule give relief from the conditions that simulated it. He did not agree with the view that the patient should be given the choice of the method of treatment; the patient was the one least qualified to judge what should be done. In addition to a search for septic foci, he advised the making of a radiograph in the axial position to show the sphenoidal sinus and a stereoscopic radiograph to show the middle cranial fossa on the affected side. He used palliative forms of treatment for the purpose only of fitting the patient for the ultimate attempt at cure, unless the patient was old and feeble. Among the many drugs that were used, butyl chloral hydrate and gelsemium in combination were of value; aspirin was of assistance in the milder cases, and he had seen some benefit from the use of "Veganin". For the relief of severe paroxysms the inhalation of trichloroethylene was useful. He did not advise the use of radiotherapy. Division or avulsion of any of the branches of the trigeminal nerve should have no place in the modern treatment of trigeminal neuralgia. Injection of the main divisions close to the Gasserian ganglion was not likely

to result in permanent cure and should be regarded as palliative treatment only.

Injection of the Gasserian ganglion with alcohol was a method that had been strongly criticized. He thought that the main objections had arisen from lack of experience by would-be exponents of the method, lack of knowledge of the anatomy of the region, and the publication of certain unfortunate experiences when the route of injection had been ill-chosen. He then went on to describe in detail his method of making the injection, stressing the importance of accurate visualization of the area by means of X rays. He had employed the method in twenty-one cases, in eleven of which the patients had since remained free of symptoms for periods up to seven years. The treatment had provided relief that was not permanent in six cases. It had failed to give relief in the remaining four. In these it had been discovered at subsequent operation that the *foramen ovale* was abnormal. If a single injection into the Gasserian ganglion failed to give relief, Dr. Clark did not persist with the method; he proceeded to divide the posterior root. In this operation a careful study of the radiographic appearances was of considerable value. The ganglion was approached by the temporal route. His practice was to leave some of the more medial fibres in all cases in which the first division was not affected. The motor nerve was preserved if easily seen; but no attempt was made to save it if the success of the operation was likely to be endangered thereby. He had not observed facial paralysis in any of his cases.

SIR HENRY NEWLAND (Adelaide) stated that the careful examination by radiology was a very great advance. Intimidated by the bad results published by Cushing, Sir Henry Newland had never attempted injection of the ganglion, but Dr. Clark's results certainly justified the use of this procedure. Following the practice of Jonathan Hutchinson, junior, to whom he was house surgeon, he operated upon patients while they were in the sitting posture. Less anaesthesia was necessary and the amount of bleeding was reduced. He used dissecting spectacles to magnify the region under operation. Care was necessary in defining the temporal bone, for it might be very thin. If a plug of wool had been inserted in the *foramen spinosum* the surrounding bone became absorbed, and this might alter the anatomy of the fossa. In fifty-two operations he had had two fatalities, one in a woman with advanced cardiac disease and the other in an elderly patient.

DR. L. C. LINDON (Adelaide) thought that it was possible to obtain lifelong relief in elderly patients with very little involvement by injection of the branches. He recalled two instances of complete relief when pain was limited to the distribution of the intraorbital nerve. If there was a wide distribution of pain in younger patients this procedure was out of the question. He used a preliminary single injection, for it allowed improvement in the clinical state of the patient. He had never attempted partial root section. He was not convinced of the physiological differentiation described by Dandy, who stated that it was possible in the posterior fossa to divide fibres which conveyed pain alone.

DR. A. E. COATES (Melbourne) was in entire agreement with Dr. Clark. It had become, he said, the fashion to discourage injections. Convinced of the practical nature of this procedure by experimental work and published results, he had used injection in fifty-five cases in the last ten years. Thirty-eight patients had been successfully cured by the injection. In four cases only had the injection to be repeated. Forty-five cases were of true trigeminal neuralgia, and the others were due to post-herpetic neuralgia, fractured skull *et cetera*. Patients with true tic were often old people and had surgical risks, many suffering from other diseases. He had sectioned the posterior root eight times with two deaths. One was that of an old man who after death was found to have hemorrhages in the pons, and the other was that of a patient upon whom he had unwisely agreed to operate ten days after an unsuccessful injection. Hemorrhages and inflammation made it very inadvisable to do this. He injected the whole ganglion in spite of the danger to the

sight. In one case only the eye was lost owing to the patient's neglect. Sometimes small areas of keratitis developed, and if any redness of the eye developed, he sent the patient to a pathologist. Jefferson had suggested that suture of the lids was unnecessary if adrenaline drops were instilled and the patient wore a shade after the operation. In some patients the lids had to be sutured later. He referred to a case of trigeminal neuralgia and facial spasm in which an injection had failed to relieve the pain. Dr. Robertson diagnosed the condition as one of arachnoiditis involving the trigeminal and facial nerves, and at operation this was found to be the case. The degenerate fifth nerve was readily seen and divided at operation after arachnoidal adhesions had been sectioned. He had never succeeded in experimental differentiating section of the nerve under a dissecting microscope, so he did not believe that such fractioning occurred. With the use of different needles with different bevels he usually succeeded in penetrating the *foramen magnum*, sometimes inserting his finger into the mouth to get the needle past the pterygoid process. He had had little experience of bad results, although a transient facial paralysis and diplopia had occurred. He condemned the employment of a general anæsthetic. Local injections were of value when it was thought inadvisable to risk ocular damage. He urged the greatest care in diagnosis and stated that cases of Schleuder's neuralgia should never be treated by procedures directed towards the fifth cranial nerve.

DR. E. GRAEME ROBERTSON (Melbourne) stated that in saying that injection should be attempted only in true trigeminal neuralgia, Dr. Clark introduced a theoretical aspect, perhaps a matter of nosology which had practical aspects. In this connexion he mentioned a case of disseminated sclerosis and bilateral trigeminal neuralgia which had been described by Dr. Ross in THE MEDICAL JOURNAL OF AUSTRALIA and the case referred to by Dr. Coates. In both these patients the neuralgia was typical. Paroxysms of very severe pain were induced by such factors as eating, touching or washing the face, and putting in dentures. In each case periods of remission had occurred. Bilateral trigeminal neuralgia was very rare, yet it occurred frequently in association with disseminated sclerosis and in two cases a sclerotic plaque had been found at autopsy at the point of entrance of the sensory root of the fifth nerve. It was probable, Foerster believed, that in trigeminal neuralgia the sensory mechanism was in a hypersensitive state, and afferent stimuli, acting as a trigger, would fire off paroxysms of pain. Parker had described a number of similar instances of pain associated with neuromata of the eighth cranial nerve. He felt, therefore, that properly selected patients in whom an organic cause for neuralgia existed, would receive relief from operation. In each of the cases recorded the patient was completely free from pain after the operation, and in the case referred to by Dr. Coates the facial spasm was much diminished.

DR. F. P. MORGAN (Melbourne) stated that differential section of the posterior root had been advocated for a very good reason: the avoidance of post-operative ocular troubles. Nearly always, he stated, there was no necessity to produce severe sensory loss on the first division, and whatever the theoretical objections to differential section were, it was possible to retain the sensation of the cornea by leaving two to three strands of the uppermost portion of the posterior root intact. It was a refinement of operation which should be done, for many patients were nervous about the loss of the eye, and frequently inquired about the possibility before the operation. The objection that complete relief of pain was essential at the first operation did not compensate for the loss of an eye. Should the differential section be unsuccessful in relieving pain, which was unusual, it was a simple matter to reopen the wound and divide the remaining fibres. In regard to partial nerve interference, he would go further than other speakers and say that partial nerve avulsion gave excellent results in elderly people in whom the good results of repeated alcohol injections were waning.

DR. Z. SCHWARTZ (Melbourne) stated that the corneal ulcerations were peculiar in that they were all much more

fleshy than those occurring in other conditions, and healed with greater proliferation of scar tissue. He had seen only one of nine patients, an early patient in whom healing occurred without scarring. He refused to cut eyelashes, as it was very important to see that all were everted. He split the eyelids longitudinally and secured careful apposition by sutures in the middle third. He always left the outer and middle third intact. He condemned the wearing of goggles on account of the discomfort induced. The skin perspired and became dirty and the patient was liable to rub the eye even after the posterior root had been divided.

Dr. J. K. ADEY (Melbourne) referred to two patients, one a woman for whom many procedures and finally amputation of the arm had been performed for pain in that arm and yet the pain persisted, and the other in whom several organs had been removed for abdominal pain. In such cases he believed it was advisable to consult a psychiatrist.

Dr. CLARK, in reply to Sir Henry Newland, said in regard to posture during operation that he sat the patient up as much as possible on the operating table. In sudden hæmorrhage from small apertures in the bone he found dental instruments very helpful. Adherence of wax was assisted by roughening the surrounding bone. To avoid damaging the skull he used de Martel's trephine. In reply to Dr. Linton, he stated that the X ray examination of the skull was his own idea, and found that it gave very important information. He agreed that distal injections and avulsion were justifiable in elderly people. It was

unjustifiable to do any major operation when the expectation of life was short, unless the operation was one to prolong life. In spite of the fact that differential section was apparently easier the nearer it was done to the pons, if Dr. Clark was to be operated on, he would insist that no attempt at differential section should be made. He thanked Dr. Coates for supporting his contention with such good results. He believed injection was valuable when there were painful diseases in the distribution of the trigeminal nerve, and in these division of the local nerve might help. He did not feel capable of performing differential injections of the ganglion, for there were no definite partitions in the ganglion; still less did he believe that differential coagulation by electrode was possible. He agreed with Dr. Robertson's remarks about trigeminal neuralgia occurring in association with pathological conditions involving trigeminal nerves. He found that in some cases of post-herpetic neuralgia one method would succeed in one patient and fail in another. When the supraorbital region was involved, he injected the supra-orbital nerve. Pain sometimes persisted in spite of all procedures, supporting the contention of some that the cause lay in the pons. It had been pointed out that complications resulted rather from trauma to the ganglion than by interference with ophthalmic fibres in the posterior root. The nearer the division to the pons, the less were the eye complications. He had had none so far, and would attempt to postpone that evil day by the use of adrenaline drops and careful suturing of the lids. He agreed with Dr. Adey that many of the patients presented psychological problems before they came to the surgeon.

Section of Orthopaedic Surgery.¹

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President's Address.

Dr. R. B. WADE (Sydney), in his presidential address, said that up to the time of the Great War orthopaedic surgery was in Australia the task of surgeons attached to children's hospitals; and the pioneers of this class of work were the late Sir Charles Clubbe, of Sydney, and W. Kent Hughes, of Melbourne.

The need shown for the use of orthopaedic principles in the treatment of wounds incurred in the Great War had stimulated the interest of medical men, and in consequence orthopaedic departments were installed at many general hospitals throughout Australia, and many surgeons were practising as orthopaedic specialists; in fact, it was a question whether the market was not now flooded. Another question as the result of the over-supply of orthopaedic surgeons arose as to whether the best service was being given by many departments in many hospitals, both great and small, and served by surgeons who held multiple posts, or whether the work would be better centralized in one or at most in a few hospitals.

Orthopaedic surgery covered such a wide field that it was already splitting up into subspecialties dealing with pædiatrics, industrial accidents and fractures. Whether in Australia there was available material for this specialization, and sufficient financial return for the ortho-

pædic surgeon, was questionable, but some specialized departments in a few hospitals would certainly be for the good of the public.

What was the future of the orthopaedic surgeon? In the first place, the present-day training confined him to the narrow ambit of his specialty and shut him off from any wider view. Some method should be evolved in the future to provide this wider view for specialists. It might be that a broader training should be given either by a preliminary training in general surgery or by the formation of teams or units which would view the case from a general as well as from a specialized point of view.

The pædiatric section of orthopaedic surgery, true to the original name, that is, to make the child grow up straight, comprised more than the mere carpentry of the surgeon in remedying deformity, and should connote a wide knowledge of children, of their upbringing, their hygiene and their diseases, and was so intermingled with the science of pædiatrics that it should be directed only from a children's hospital, which was the one place where such work could be done on a sufficiently large scale.

Industrial surgery and the surgery of accidents, owing to the fact that the human being had not kept pace with increased industrial speed and was unable to think ahead of the still rapidly increasing factor of the speed of mechanized bodies, were already a self-contained section. The fact that industrial surgery and the surgery of accidents in most cases demanded general as well as ortho-

¹The meeting of the Section of Orthopaedic Surgery with the Section of Pædiatrics has already been recorded.

pædic surgery, was an argument in favour of the preliminary training for the orthopaedic surgeon along general lines. This class of work had associated with it that of evidence at the law courts, and it would surely be not too much to ask that some specialized training should be given as to the proper method of approach of specialized evidence before a judge and jury.

Industrial surgery should be carried out by a unit or team, in which the orthopaedic surgeons, the physiotherapists and the school of vocational training were all combined and all worked in unison, under the control preferably of an orthopaedic surgeon, who was the only one who could visualize the final aim of the activity and could understand the value of the different phases. Such vocational centres as a part of an orthopaedic hospital unit were almost unknown in Australia. The report on fractures by the British Medical Association and the example of Böhler's and similar clinics, showed the need for such clinics in large hospitals, but they again should be instituted as complete units, with an orthopaedic surgeon in charge. The resident medical staff should not be constantly changing, but there should be a proportion of those who would stay on for some years and be thoroughly trained in the organized routine. The unit should be staffed by much larger proportions of fully trained nurses than was possible under the system that existed in Australia, where the majority of nurses in any hospital were trainees. Such nurses should be thoroughly trained and skilled in the application of splints.

Associated with the team, of course, should be an X ray unit, the members of which were trained to participate in the work in the operating theatre, so that with all acting in unison there should be no loss of time, and everything should be done as compactly and neatly as possible.

Dr. Wade concluded by stating that these were but the views of an individual as to the future scope and trend of orthopaedic work, and they would perhaps be put into operation to a greater or lesser extent as time went on, in what way no one could for the moment determine. One thing was plain, that under the present system of honorary service it was impossible for a man to find time to control such an orthopaedic unit as it should be controlled and at the same time earn his living. Dr. Wade wondered whether a nationalized service offered anything better.

Dr. D. J. GLISSAN (Sydney) asked the President to waive the rule against discussion on the President's address. He regarded it as an exhaustive survey and was grateful that timely attention had been called to future possibilities to enable them to set their house in order.

Dr. C. W. B. LITTLEJOHN (Melbourne) said that he thought that specialism within specialism was being carried too far. He did not agree with the present system of training young surgeons, who he thought should be compelled to do three years of general practice before being allowed to specialize.

Matti's Operation for Ununited Fractures with a Spongiosa Transplant.

Dr. THOMAS KING (Melbourne) presented a paper on Matti's operation for ununited fractures with a spongiosa transplant. He reported experiences in six cases with full details of the treatment, including personal observations. The special features of the method were as follows. A part of the pseudarthrosis or fibrous tissue between the fragments was left as a bridge or hinge which prevented future displacements. The sclerosed bone ends were not sawn off because this caused shortening and required considerable lifting up of the surrounding tissues, thereby affecting the blood supply to the bones and so prejudicing subsequent ossification. The bones above and below the fracture site were guttered or "saucerized" until bleeding occurred from the cortical bone. This might occur only three or four inches away from the fracture site, and therein lay one of the advantages of the method as against cutting off the ends of bones until bleeding occurred. The medullary cavity was scraped out thoroughly (all removed bone was kept for later use). This in itself, as shown experimentally by Matti, stimulated the endosteal forma-

tion of bone. Spongiosa or cancellous bone from the great trochanter (not the femoral neck) was now packed firmly into the excochleated fractured bones and between their bone ends. This also stopped the bleeding. No tourniquet should be used, otherwise it was impossible to determine when healthy bleeding cortical bone had been exposed during the guttering process. Bone chips about the size of a split pea were obtained by chopping up the bone removed from the region of the pseudarthrosis and were packed loosely on top of the spongiosa transplanted bone (the important part of the transplant). The wound was loosely sewn together. The X ray appearances resembled an osteogenic sarcoma. The method had been used when Beck's multiple subcutaneous drilling method or bone transplants with massive grafts had failed. Beck's method should always be tried for the tibia, because it was simple and good, but in the case of more deeply situated bones it could not be used without open operation. The method of spongiosa transplant could be used even in the presence of infection. Spongiosa transplants were easily vascularized and appeared to be the most certain transplants for obtaining osseous union. They might require to be supplemented with large tibial lay-on bone transplants.

Dr. D. J. GLISSAN (Sydney), although he had not personally carried out Matti's operation, was interested to hear Dr. King's paper. He considered that an essential feature in all bone grafting was to supply as much medullary bone as possible.

Dr. L. O. BETTS (Adelaide) said that he could never see why there need be any worry about a slide graft operation. He considered the risk of sepsis very slight.

Dr. W. R. ANGUS (Nhill, Victoria) said that as a general practitioner he had some diffidence in speaking. He had recently had a case of non-united fracture which he had treated by a plaster cast, and he had encouraged the patient to walk. No union had resulted. He had then freshened the ends of the bone, but without success. Finally he nailed the bones together with carpenter's nails and encouraged the patient to walk. Good union had resulted. The theory of the reason for such a result was difficult to understand, but perhaps, as had been suggested in Matti's operation, local hormones were liberated.

Dr. J. B. COLQUHOUN, who had read Dr. King's paper, said in reply to the speakers that he had seen Dr. King operating in two of the cases reported and had seen the results afterwards. He considered the method an advance on those previously used in cases of non-union. Spongiosa was easily obtained from the trochanter, and he considered that the procedure would be of help in such difficult cases as failure of one end of a bone graft to unite.

The Use of the Smith-Petersen Nail.

Dr. J. W. HOETS (Sydney) read a paper on the use of the Smith-Petersen nail. He said that when the use of the Smith-Petersen nail was discussed some two years previously at the 103rd annual meeting of the British Medical Association at Melbourne, considerable divergence of views had been expressed both as to its value in fractures of the femoral neck and also as to the most suitable method of introduction of the nail. Professor Hey Groves had been very much opposed to what he termed the "blind method" of Dr. King, of Melbourne. He preferred open operation, and, holding this view, he not unnaturally considered that the nail was quite unsuited for very old people and for others who were "poor operation risks". Since that meeting, however, Professor Hey Groves had himself described an instrument for introducing the nail "blindly", so that he appeared to have recognized the extreme value of the Smith-Petersen nail to the very people to whom he had previously denied its benefits.

Dr. Hoets said that the first point he wished to emphasize again was the value of the nail as a life-saving measure to the old and feeble. The passage of time had strengthened his belief that this was perhaps the greatest benefit of the device. The Whitman method was excellent in the fairly robust, but was badly tolerated by the very old and feeble. In these people the Smith-Petersen nail might be introduced and the fracture fixed within a day

or two, and the remainder of their lives was spent in comfort, whether they lived long or not.

Dr. Hoets then discussed the operation. He said that he preferred to do it as soon as the patient had recovered from the shock of the accident—within a day or two—as delay often brought danger from hypostatic conditions *et cetera*. He thought that gas and oxygen were the ideal anæsthetic, and when this was not available he preferred the open administration of ether to spinal anæsthesia. He had had several unpleasant experiences with the latter, which was much more upsetting to an aged patient than a general anæsthetic. He had had no bad effects from ether. Dr. Hoets said that he did not like local anæsthesia and had used it twice only. The conscious patient was under considerable nervous strain and would be safer under gas and oxygen or ether given by the open method if he had sufficient premedication to render him unconscious. Dr. Hoets added that the operation itself had been so generally used since the last congress meeting that there was little he could say on the subject. There were, however, one or two points which should be kept in mind for the securing of good results. The first and most important of these was, of course, accurate reduction, controlled by good X ray photographs taken in two planes. He believed that most surgeons used the so-called "blind" method as a routine, with almost completely satisfactory results. There would always be occasional failures whatever method was used. At times open operation would be required in neglected cases of non-union.

Dr. Hoets went on to say that he could not state what the time limit from accident to operation by the blind method might be. He had had two cases within a week or two in which three months had elapsed since the accident, and he had performed open operation in both. In one the closed method would have been quite satisfactory, but in the second the amount of fibrous tissue which had formed would have effectively prevented accurate reduction.

Dr. Hoets then discussed after-treatment, and said that at one time he liked to get the patient onto his feet at the earliest possible moment and to have him walk out of hospital in a fortnight, but now he was less ambitious. He liked to get the patient out of bed into a chair straight away, but apart from that—the real life-saver—he let him find his own way and use crutches rather than begin too early to bear his weight. He also issued a warning against the enthusiastic masseuse, and said that he had had one case wrecked by too vigorous and active exercises, which he was sure shook the nail from the head. He discovered by chance the patient who was nearly ninety years of age, lying on his back and violently kicking his legs in the air. He failed to get union.

Dr. Hoets said that on general principles he liked to remove the nail after twelve months, but comparatively few patients would have this done.

Dr. D. J. GLISSAN (Sydney) said that Dr. Hoets's paper supported the observation now generally accepted that with immobilization fractures of the neck of the femur would unite. At the Melbourne meeting in 1935 he had been upset by Professor Hey Groves's statement that the only method of treatment was immobilization with a Smith-Petersen nail. In this country, with its scattered population and scattered surgical centres, such a statement was dangerous and he was glad that it had later been qualified. He said that in the early days of the use of the nail he had been keen to get his patients up early, but now he was much more conservative. It was necessary in these cases to realize that a fracture was being treated and that certain rules and principles must be followed—a doctrine that orthopaedic surgeons would appreciate more than general surgeons. He said that whatever method was being used (the nail, Whitman's plaster *et cetera*), the essential factor was bone union, which was not necessarily dependent on the use of mechanical contrivances; but the more efficient the immobilization, the better the results. Personally he used ordinary nails, not Smith-Petersen nails.

Dr. GORDON SHAW (Melbourne) said he considered it a matter of great importance that fractures of the femoral

neck should be discussed by the meeting. At first the Smith-Petersen operation had been received with enthusiasm and results were better than previously; some surgeons said it was the only method of treatment. The passage of time, however, led one to be more critical. Dr. Hoets's results were good and similar to those obtained by others, but the results in many cases were not perfect. The method was one to be used by specialists only, and even under the best conditions there was always the danger of arthritis developing in the hip. A critical review would tend to confirm his statement that the affected hip was arthritic while the other hip was normal. He said that arthritis might follow a fracture of the femoral neck treated by any method, but it was more common after the use of the Smith-Petersen nail. Such arthritis was painful and disabling. In people of seventy to eighty years of age the Smith-Petersen method had special advantages; other methods might not be applicable and recumbency was dangerous. Dr. Shaw said that in younger people the surgeon should consider whether the possibility of osteoarthritis was not greater than the risk of non-union. There was no question but that a fractured femoral neck might be made to unite by older methods, such as Whitman's, with a large percentage of excellent results, especially in younger patients.

When that method failed, a bone graft with a fibular peg led to good results. He suggested that cases in which Smith-Petersen methods had been used should be reviewed, and if osteoarthritis could be attributed to the use of the nail, it should not be a routine method in young patients, in whom Dr. Shaw did not use a nail, but relied on Whitman's method. He said that the Smith-Petersen nail had advantages, but that a long view should be taken and the condition of the patient considered three to five years after its use. Dr. Shaw did not like spinal anæsthesia. The safest anæsthetic was ether or gas and oxygen; but if an operation was to take several hours, a general anæsthetic might not be practicable, and in such cases basal *plus* spinal anæsthesia had the advantage of complete relaxation leading to easy reduction.

Dr. Hoets had mentioned the Hey Groves apparatus. Dr. Shaw said he had read of it, but had not seen it; he thought that the femoral vessels were in danger of perforation by the pin Hey Groves used. Dr. Shaw said he agreed with Dr. Glissan regarding after-treatment. He did not think it was fair to expect a nailed bone to bear weight until bony union had developed. He allowed his patients to move in bed without weight-bearing.

Dr. L. O. BETTS (Adelaide) showed a specimen of a fractured femoral neck from a woman aged eighty-three years. He said that he did not like his patients walking early, but had had one patient up at six weeks. He believed in activity in bed; later he allowed his patients to hang the leg over the side of the bed. He put his patients on crutches at twelve weeks until voluntary use of the limb returned and the patients voluntarily abandoned their crutches. He considered that diminution of the range of movement in the joint was indicative of trouble at the site of fracture. He favoured general anæsthesia as against spinal anæsthesia, and considered it important to remember that not only was the fracture being treated, but the patient. He said that old people who could move their limb in bed a day after operation were much happier and freer from pain compared with patients for whom older methods were used. In addition, the nursing was much simplified, as the patient could be turned and the back cared for.

Discussing Dr. Shaw's statement on osteoarthritis, Dr. Betts said that he could not see how a nail caused more osteoarthritis than a fibular graft. He considered the Smith-Petersen nail the nearest approach to a perfect internal splint. The metal was non-irritant and it held the fracture; further, reduction could be obtained and maintained. Whitman's method did not give such good reduction. Personally he had not seen reaction round the nail unless it was badly inserted. He said that he used Watson-Jones's guide after reduction of the fracture, with the leg in internal rotation, but cut down and chose the site of entry of the pin. He located the femoral

vessels and if the guide was kept horizontal, the first insertion was successful in 50% of cases. If internal rotation was maintained, an error of 15° to 20° from the horizontal did not matter.

Dr. C. W. B. LITTLEJOHN (Melbourne) said that at the Royal Melbourne Hospital they were compelled to use the "haemorrhagic" method, as no shock-proof X ray apparatus was available. He had discarded the method of sawing off the great trochanter, as the results were variable. He found that Watson-Jones's exposure was very good and the nail usually in good position. He used ether or gas and oxygen, in the latter circumstances using premedication with "Medinal", "Amytal" or paraldehyde. He had used local anaesthetics, but they were uncomfortable for the patient, and if local anaesthesia was used with basal narcosis the patient was non-cooperative and liable to wake up. Dr. Littlejohn said that Dr. Hoets's slides of X ray films were excellent, but the area of rarefaction referred to was due to a loose piece of bone, which he did not worry about and at times removed. In other cases the bone crumpled up at the time of fracture and caused the appearance of rarefaction. He had had personal experience with a plated nail which became eroded, and vacuolation occurred round it. He had removed the nail and a rusty patch was found on it. He considered that rustless steel nails only should be used. Three of his early patients operated on under local anaesthesia had been allowed to walk out of the theatre. Two of them had done well, the third badly, and now he allowed no weight-bearing for twelve weeks.

Dr. J. B. COLQUHOUN (Melbourne) said that he had worked with Smith-Petersen. In 1929 a combined meeting of British and American orthopaedic surgeons had discussed fracture of the neck of the femur. English results were then shown to give not less than 40% of success and the American not less than 30%. If the Smith-Petersen nail improved those percentages, it was of value. Referring to arthritis, Dr. Colquhoun said that nowadays surgeons were more critical of results, and perhaps as much arthritis had occurred in the old days. A follow-up at the Massachusetts General Hospital revealed arthritis after all methods. Cotton showed that good bony union followed heavy malleting over a padded felt on the trochanter.

Dr. Colquhoun considered that Whitman's method yielded disappointing end-results, with non-union, absorption of the neck, *coxa vara* and osteoarthritis. Some cases needed the nail, others could be treated without it. He said that knitting needles had been used by Gaenselen, who put his patients up with flexion of both femora. Jahns, in America, had suggested slight abduction with 40° of flexion and maximum internal rotation, and Dr. Colquhoun had obtained perfect results at the Children's Hospital, Melbourne, by using that method in a child with a slipped capital epiphysis. Such methods he considered might avoid the development of osteoarthritis, and he agreed with Dr. Betts that the chances of osteoarthritis were greater if bone pegs were used. He used twilight sleep and local anaesthesia at Saint Vincent's Hospital and the Royal Melbourne Hospital, with comfort to the patient and the surgeon.

Dr. H. R. POMROY (Adelaide) said that he was surprised that there was no unanimity in London regarding treatment of fractures of the femoral neck. Blundel Bankhart still used carpenter's screws at Liverpool. There were three clinics employing different methods. Watson-Jones used the Smith-Petersen nail, McFarlane the Whitman plaster, MacMurray the transverse Lorenz operation. They could not all be right nor all wrong. He considered that MacMurray's results were probably the best seen in England. McFarlane's cases showed some bad results, as did Watson-Jones's. Surely at the Mecca of orthopaedic work some final conclusions should be reached.

Dr. E. B. M. VANCE (Sydney) said he thought that MacMurray used the Lorenz operation only for cases of non-union, and the Smith-Petersen only for early cases. Personally he favoured the Smith-Petersen nail especially in old age, where it was a magnificent weapon. He had done many operations on patients over eighty and ninety

years of age, and in one case both sides had been pinned in successive years with excellent results. Dr. Vance referred to the statement of Thomas that non-union of a fractured neck of a femur was not so great a disability. Many became painless, and deformity might be minimized by wearing a Thomas hip splint for a long period, and it should be remembered that in any method non-union might result.

Dr. HOETS, replying, said that he was interested in Dr. Glissan's remarks regarding weight-bearing. He was not repentant about early movements, getting his patients into chairs from the beginning, but, like Dr. Betts, he kept them on crutches for ten or twelve weeks. Regarding Dr. Shaw's comments on arthritis, he considered that if it did supervene it was difficult to blame the nail rather than the actual trauma. He agreed that in young patients Whitman's method gave excellent results and was of more value if controlled by lateral X ray pictures. He considered that some cases of non-union following Whitman's method were due to the lack of lateral radiographs. He had been interested in Dr. Betts's specimens. He did not think that the nail showing corrosion in the X ray picture was a plated one. He envied Dr. Vance his patient with both sides nailed.

Tennis Elbow.

Dr. E. F. WEST (Adelaide) read a paper entitled "Tennis Elbow". He said that opinions still differed concerning the pathology of this condition and the most satisfactory method of treatment. In discussing symptoms, he said that the pain was produced by the execution of backhand shots in tennis, particularly the backhand top-spin drive. The execution of this shot involved violent and sudden contraction of the radial extensors. If the patient lifted a light object when his forearm was pronated and his wrist dorsiflexed, he might experience sudden loss of power and drop the object. Mills's test consisted in putting the fingers and wrist in full flexion and pronation and then extending the elbow. This produced the typical pain, felt in the region of the external epicondyle and radiating down the back of the forearm to the wrist. The site of maximum tenderness was over the anterior aspect of the external epicondyle; the area of tenderness extended from this point to the line of the elbow joint. The disorder usually disappeared in about nine months without treatment, except possibly the avoidance of the particular movement that caused the pain. But in some cases it lasted much longer and defied treatment. The onset was usually gradual, after a few days or more of strenuous play. But tennis elbow might appear suddenly, after direct injury. There was a remarkable variety of opinions concerning the pathology of the condition. In a recent article Cyriax had mentioned 26 different opinions. Dr. West mentioned five of these. An old view was that strain or tear of the *pronator radii teres* muscle was responsible. Dr. West considered that this could be excluded, as the pain and tenderness were on the outer side of the elbow joint. Trethowan held the view that nipping of synovial fringes in the radio-humeral or radio-ulnar joint led to traumatic synovitis of the elbow joint. Dr. West disagreed with this view. It had been suggested that the pain of tennis elbow was a manifestation of radio-humeral bursitis. This bursa, which lay beneath the conjoined origin of the extensors, was present in a number of subjects; but there was no evidence that it was concerned in the aetiology of tennis elbow. A fourth opinion was that the disorder was due to strain and tearing of the *supinator brevis* muscle. This would not explain the pain produced by gripping and the inhibition of certain purely wrist movements. The opinion held by the majority of observers and with which Dr. West agreed was that there were tearing of the tendon of origin of the extensor muscles and consequent periostitis. Periosteal bone proliferation could be demonstrated by X rays in some of the well-established cases.

Treatment was not always satisfactory. When the condition had existed for some weeks or months, it could be cured probably in most cases by manipulation under general anaesthesia. He thought general anaesthesia was necessary in this method of treatment, and most failures

were due to not observing this. Manipulation consisted in full flexion of the wrist and full pronation of the forearm, then full extension of the elbow. One manipulation was usually sufficient. Cyriax described a method that obviated the necessity for an anæsthetic. The patient sat with the elbow at a right angle and the forearm supinated, and friction with firm pressure was applied to the anterior part of the external epicondyle for five to ten minutes. The forearm was then fixed as fully extended and supinated as possible. Massage was repeated three times a week until the patient recovered. Dr. West had employed the method in one case and obtained a satisfactory result. The application of adhesive plaster gave relief, but took a long time to cure. Tight strapping round the forearm in its upper third was the best if this method was used. He suspected a neurotic element when the condition failed to disappear in spite of treatment. In such cases he advised the application of a short forearm splint providing for dorsiflexion at the wrist.

Dr. D. J. GLISSAN (Sydney) said that he had had a case of tennis elbow with uncertain pathology and indefinite history. He had decided that the condition might be due to a bursa. At operation there was no bursa, but a small mass of purplish granulation tissue was found in the muscles, and the pathologist reported that it contained synovial membrane. Recovery had followed, and five years later a similar condition developed on the other side; at operation nothing abnormal was found, but the patient was better after that operation.

Dr. GORDON SHAW (Melbourne) said that a review of the pathology of tennis elbow was interesting. In different cases there were different pathological conditions. In some cases there was a small bursa, in others a synovitis or a fibroperiositis in the region of the extensor muscles, especially the *extensor carpi radialis brevis*. A septic focus should be looked for. He himself had had a tennis elbow which had been cured twelve hours after the extraction of a tooth. Recently he had injected saline solution into the painful area, and the method was applicable to fibrositis in many parts of the body. He had used it extensively at the Caulfield Repatriation Hospital. Its use had been advised for painful shoulders by an American surgeon. In elbow conditions five to ten cubic centimetres were used, in other areas greater amounts. Pain was often considerably increased and was severe for two or three days, but afterwards considerable improvement occurred. Three or four injections might be necessary. It was a simple method which gave satisfactory results.

Dr. L. O. BETTS (Adelaide) said that tenderness was sometimes found over the external epicondyle, but in his personal cases tenderness had been found over the joint line. He had no doubt that the pathology was variable, and had seen one case in which periosteal reaction was revealed on radiological examination. It was known that in other joints, such as the knee, a wrench of the internal lateral ligament might lead to disability which disappeared after manipulation. He was interested to hear Dr. Shaw's reference to saline treatment; he had used it with varying results.

Dr. C. W. B. LITTLEJOHN (Melbourne) said that the problem of tennis elbow was an interesting one, and, as Dr. Shaw had stated, there were a number of conditions which gave the same syndrome. He had received his own tennis elbow by bruising his lateral epicondyle on a concrete wall while playing "squash". He said that a more common cause was internal derangement of the elbow with some form of arthritis in the radio-humeral joint. He had operated in fifteen such cases and in every instance something had been found in the joint. In a number the head of the radius had been pulled from the orbicular ligament and the edge of the ligament was pinched. In others a synovial fringe had been pinched and removal led to cure. He had never found a bursa, but post-operative scarring might pull a synovial fringe out of the way and thus lead to cure. Dr. Littlejohn referred to tennis elbow on the near side of the arm, which he considered was due to a peri-arthritis round the radio-ulnar joint. Septic foci should be looked for. In a number of cases of tennis elbow, about one in five, he considered that manipulation

was successful. Mills's method had not been a success in his hands. Violent extension in the supinated position was often accompanied by a click and resulted in cure. He thought that the head of the radius was forced to the proper position and the upper edge of the orbicular ligament was forced out of the way.

Dr. J. B. COLQUHOUN (Melbourne) said he had discussed the condition with Osgood, who told him that he had excised three bursæ. Some cases responded to manipulation, others to rest in a plaster case, others, in Melbourne, to the manipulations of a football trainer. Dr. Colquhoun was impressed by Dr. Littlejohn's operation results.

Dr. E. B. M. VANCE (Sydney) said he had had success with cases of tennis elbow by using a circular ring; but he thought that it was the tight band of strapping encircling the forearm, used in conjunction with the ring, which led to cure.

Dr. W. R. ANGUS (Nhill, Victoria) said he had had two patients with tennis elbow, but had immobilized one with plaster without success. He had concluded that the pathological condition was allied to Perthes's and Osgood's diseases, and that it was caused by some trauma leading to low grade periostitis and local synovitis. He had therefore drilled two holes into the painful site with good results.

Dr. West, in reply, said he had written his paper primarily to invite other opinions. As Dr. Gordon Shaw had pointed out, there must be several different pathological conditions to account for the syndrome. He wondered why, if the condition was due to nipping of synovial fringes, spontaneous recovery occurred in so many cases. Dr. Glissan's patient with the bilateral condition and with bursal tissue on one side seemed to show that the presence of a bursa was sometimes the underlying cause. Regarding Dr. Shaw's remarks on focal sepsis he had always been pessimistic of the theory. The Liverpool workers were not impressed by it now, and MacMurray did not search for septic foci. He thought that the injection of saline solution was useful, but said that he believed the tenderness to be on the bone and not on the joint line, as suggested by Dr. Hoets. Dr. Angus's method of drilling the bone probably had the same effect as the Liverpool method of thrusting a hot needle into the tissues.

Static Foot Defects.

Dr. E. B. M. VANCE (Sydney) read a paper entitled "The Analysis of Static Foot Defects". He said that to function perfectly the foot should not be displaced too far outwards or inwards in relation to the leg in standing, nor should it suffer any restriction in its up and down lever-like action in walking. It should be kept in balance by its muscles. If it went out of balance one set of muscles became short and too strong, while the other set became long and too weak. Five of the muscles of the limb, sweeping upwards from the toes, were attached to the calcaneus, two on the outside and three on the inner side, by their tendon sheaths. By this means they kept the calcaneus in its correct position. The invertors were much stronger than the evertors; but fatigue might impair their power and allow the heel to go out of balance. Dr. Vance drew attention particularly to the *flexor hallucis longus* muscle, which had a special importance in the task of keeping the heel well balanced. It was a beautiful, strong muscle; but its full strength could be exerted only while the great toe retained its normal straightness. Once the great toe was deflected it became unstable, losing its value as a fixed point. This lack of stability robbed the *flexor hallucis longus* of much of its power. Most foot defects were caused by failure to maintain the full strength of the invertors, and the majority were curable by the provision of some assistance to the invertors in their task.

When the heel became everted, it carried the whole foot with it; but gradually the fore part of the foot, under the influence of the *tibialis* muscles underwent a compensatory torsion at the mid-tarsal joint, so that the inner longitudinal arch became flattened and flat foot resulted. There were less common foot defects, due to some intrinsic imperfection. Among these might be mentioned club foot and claw foot.

When a foot lost its balance its component joints were subjected to cross-strain and each became an irritated joint. This resulted in spasm and eventually contracture and local deformity.

In the prevention of deformities of the feet, the designing of proper shoes and stockings occupied first place. The shoes and stockings of civilization were both responsible for deflecting the hallux from its alignment. Right and left stockings were needed, preferably digitated; at the very least they should be square-toed. A correct shoe would give full room to the hallux, at rest and work; it would have a curve to preserve the inner arch; its heel ("counter" in the terminology of the trade) would grip the heel of the wearer firmly; its shank would be wide. Dr. Vance stressed the importance of correct footwear for children, pointing out the disastrous consequences of badly fitting footwear.

In some instances, such as when the feet had a greater weight to bear or when occupations entailed long periods of standing, a wedge should be worn on the inner side of the heel of the shoe.

In the treatment of static foot defects of a minor degree adjustments to the heels and soles of shoes were suitable methods. In addition, suitable exercises should be practised. Manipulation, preferably under anaesthesia, had great curative value. The use of the Thomas wrench was sometimes necessary. The use of splints of plaster of Paris was needed when the invertors had to be shortened and evertors lengthened, as in *pes valgus*; when the *tendo Achillis* was short, but not too short; in the correction of *pes cavo-varus*, and in the correction of a moderate degree of *hallux valgus*. The patient was allowed to walk with the splints in position.

Finally, he discussed the rôle of subcutaneous tenotomy. Tenotomy of the *tendo Achillis* was likely to be necessary only in the treatment of congenital club foot. There was frequently need for tenotomy of the plantar fascia in claw foot, of the peronei in flat foot, and of the extensors and flexors of the toes in claw toes. Tenotomy of the *extensor hallucis longus* was employed for *hallux malleus*, tenotomy of the *flexor hallucis brevis* for *hallux rigidus*, and of the conjoined tendon and the *extensor hallucis brevis* for *hallux valgus*. In the future, tenotomy would be performed more and excision of joints less frequently.

DR. D. OFFICER BROWN (Melbourne) said that it was perhaps unnecessary to stress too much the separation of the component parts of the foot in its consideration as a functional unit. Although they accepted the bulk of Sir Colin MacKenzie's teaching of one muscle, one action, yet from a practical point of view of the relation to prognosis and treatment it was necessary to focus attention not so much on single muscles as on muscle groups. When man's ancestors left the ground and climbed trees, both his forelimbs and hindlimbs assumed structural alteration, which in the forelimb particularly had been, although remaining backward in the evolutionary scale, of vast importance in relation to man's subsequent ascendancy in the animal kingdom. Evolutionary changes had not kept pace with changing requirements, and possibly the feet more than any other part of the body had metaphorically as well as literally felt the change. The orthopaedic surgeon could never prevent man from paying the price, but he could at least make payments easier. The orthopaedic surgeon was faced with a host of these conditions, which Dr. Vance had ably referred to as static deformities. These included spinal curvature, *coxa vara*, knock-knee and, of the greatest importance, foot defects.

There was no doubt that the human foot in its perfect form was a pretty piece of mechanism, but the mechanism, as Dr. Vance had shown, broke down all too readily. It was frequently in the first few years of life that the seed of subsequent increasing deformity was beginning to germinate, and the process could usually be remedied by the simple measure of wedging the heel and, when the child was old enough, of instituting suitable exercises.

They were all agreed that from infancy onwards inadequate shoes and stockings made matters immeasurably worse, and the end-results were often disastrous. Dr. Brown was glad that Dr. Vance had stressed the great

importance of stockings. Perhaps they would learn to discard socks altogether for children and adolescents.

Dr. Brown was interested to hear Dr. Vance's ideas on the pathogenesis of spastic flat-foot. Apparently he regarded arthritis as a relatively late factor. Dr. Brown had been impressed by Trethowan's view of this condition, as embodied in the term "tonsil feet". He felt that the tonsillitis was the essential background of this condition, and, following Trethowan, he always performed tonsillectomy as a first measure in the treatment of the condition. At the same time as the tonsillectomy was performed, except in the very late cases, which had been years developing, it was easy to manipulate the foot into a position of full varus, associated contractures of, for example, extensor muscles being dealt with at the same time. Plaster was applied with the foot in the over-corrected position and left for some months. Dr. Brown had never found it necessary to divide the peroneal tendons, nor did he see what was to be gained by so doing.

Dr. Brown had not seen cases of spastic flat-foot progressing to advanced claw-foot. He would be interested to hear more of this from Dr. Vance. He quite agreed with Dr. Vance that in many other foot conditions a great deal could be done with subcutaneous tenotomy.

He had often observed that the boots of children with long, weak valgus feet and abducted heels were nevertheless worn down on the outside of the heel. It seemed doubtful in these cases whether surgeons should obey their first impulse, which was to build up the inside of the heel. Dr. Brown thought that these patients might be best treated with Dr. Vance's excellent suggestion of a rubber button under the centre of the inside arch. Dr. Brown suggested that it would be wise to limit the use of this button to short periods at first, gradually increasing the periods with a view to reducing the muscle fatigue which must occur.

The Thomas wrench was an instrument of great value, but its frequent use might produce a traumatic arthritis which would in the end make matters worse. Dr. Brown was in strong agreement with Dr. Vance's views that if any major surgery was necessary the most suitable operation was a mid-tarsal and subastragaloid arthrodesis of the Naughton Dunn and Hoke type, with removal of sufficient bone to enable the foot to be placed in good position. Persistent pain and discomfort should be regarded as one of the main indications for operation. It was usually unwise to submit to arthrodesis the feet of children before the age of twelve to fourteen years. After such operation Dr. Brown urged the great value of a walking iron applied to a closely fitting plaster within three weeks or so of operating. He usually put on a loose padded plaster splint along its whole length, on the dorsum, so that it could easily be sprung if required, and after two or three weeks the non-padded cast and iron were applied. The early use of a walking iron allowed of a stronger arthrodesis in less time.

In conclusion, Dr. Brown urged that the first line of defence against the static defects of posture was in prevention in the early years of life and in the adolescent stage of development, and that the prevention and alleviation of these static defects lay along the lines of controlled physical education. Australia was far behind in the development of physical education. England was awake to the need. The Education Department in Victoria was moving actively. A course of teaching in physical education had been established, and there was no doubt that the time was coming when the development of these postural or static defects would in the main be kept in check. Dr. Brown held that the orthopaedic surgeon had a great national responsibility in this matter. It was his duty to see that the soul-destroying physical culture of the past was replaced by a coordinated scheme of physical education, resulting in the development of balanced and coordinated bodies and minds.

DR. L. O. BETTS (Adelaide) had had personal experience of foot strain and belonged to a family with high arches. Standing in hospitals for eight hours daily gave him much pain in the small muscles of the feet, but on one occasion, after a walk of fifteen miles, he had no further trouble.

Since then he had had a recurrence of pain in his transverse arches, but exercise at golf twice a week kept him free. He made his own patients skip or walk.

Dr. D. J. GLISSAN (Sydney) said he was a rebel regarding flat-feet. The fault with the profession was that they judged a foot by form and not by function. When confronted with a patient with so-called flat-foot, he asked in what way did that foot function abnormally. Shape did not matter. How were the functions of carrying weight fulfilled? There was one phase of lower limb function which was neglected. If a foot was inverted it was found that as it was inverted it passed through a plane which brought it into direct line with the leg, but that could be done only when the foot was not bearing weight. If the foot was fixed and the thigh was rotated laterally at the hip joint, the same effect was produced. He divided cases into three types: (i) Physiological, in which the foot itself was free of fault, the muscles were developed, the shape was sound and the joints were normal. The trouble was not in the foot, but in the method of using it, and the physiology of walking was incorrect. Such cases could be cured by the education of the patient. (ii) The anatomical type. There was faulty function and shape of the foot due to anatomical error, for example, paralysis of the *tibialis anterior*, the spasmodic type or congenital deformity, for example absence of the fibula. (iii) The physio-anatomical type. This was common and difficult to treat. As the patient stood the body weight was deflected over the medial side of the foot, but the lower end of the tibia was bowed with irrevocable rotation of the tibia. A wider view should be taken, and the disability should be considered more in terms of function than form. The object in the physiological type was to teach the patient how to use the foot correctly and also the leg muscles individually. If a patient then used strong muscles correctly the trouble was corrected.

Dr. J. B. COLQUHOUN (Melbourne) said that he had never been able to follow Dr. Glissan all the way. He found that foot troubles differed in children and adults. At the Children's Hospital, Melbourne, he rarely found loss of the transverse arch. He saw many so-called flat-foot or pronated feet. In such cases very little had to be done apart from teaching the child to stand and walk and strengthening the muscles. A Thomas heel might at times be used, but he considered that it should not be more than half an inch longer than the normal heel. He could not see the advantage of raising both the inner heel and the outer sole. He thought that arthrodesis of the first cuneiform with the metatarsal might be reserved for cases in which muscle training failed. In adults the problem was difficult. The broken-down foot, such as was seen in the American negro, looked bad, but was painless and should be left alone. In adults, loss of the transverse arch was frequently associated with *hallux valgus* and callosities. The manufacturers of footwear did not help. Exercises, even in the aged, with strapping of the metatarsal arch with or without correction of the *hallux valgus*, gave great relief.

Dr. GORDON SHAW (Melbourne) said that he did not see much fundamental difference in the opinions expressed. It was a question of muscle balance. Treatment of the failure of muscle balance was by exercise. Efficient exercise of the muscles of the feet and toes was important, and exercise of the toes did not receive sufficient attention. Plenty of room should be provided in the boots worn, but locally made boots were bad and cramped the toes, so upsetting muscle balance. Dr. Shaw asked what was the cause of the pain, and pointed out that a very bad-looking foot might be free of pain. Ballet dancers, for example, had an extreme degree of valgus without pain. Shape was not of great importance so far as pain was concerned, but with the other functions, such as locomotion, shape was important, and flat-footed people were not good sprinters. Pain might follow illness or infection, such as influenza, or might be a sequel of pregnancy. In such cases fibrositis and adhesion in joints should be treated. Treatment with wedges or metatarsal bars was palliative. Another cause of pain was arthritis with reflex spasms and secondary deformity. The primary arthritis should

be relieved in such cases. The whole question was important on account of the distress and pain it caused in the community, and was largely preventable by the use of proper footwear (stockings and shoes) and by exercises to develop muscles of the foot and toes.

Dr. VANCE, in reply, agreed with Dr. Glissan that not only should the muscles below the knee be exercised, but that the thigh muscles also should be developed in the correction of flat-foot. He considered that some of Dr. Colquhoun's difficulties in dealing with anterior arch troubles would be lessened by strapping of the *tendo Achillis* if it was shortened, and callosities would then disappear, unless enlarged bursæ had developed beneath them, which required excision. He did not agree with Dr. Shaw, and considered that in most cases arthritis was secondary, except rarely, when infected teeth or tonsils might be causative.

Contracted Toes.

Dr. D. J. GLISSAN (Sydney) read a paper entitled "Contracted Toes". He said that dorsal contracture at the metatarso-phalangeal joints accompanied by plantar flexion at the first and sometimes the distal interphalangeal joints was one of the commonest deformities of the human foot. Generalized contracture of the toes might be secondary to other deformities, such as *pes cavus*, *hallux valgus*, paralytic equinus, and scar contractures, and also to injury. But there was a primary form, affecting chiefly young adult males; it was bilateral and not associated with any other deformity of the foot. It was important to recognize this, as the condition had been constantly referred to as claw-foot or *pes cavus*. In many cases no cause was discoverable; it was possible that they represented a retrograde evolutionary process in response to the steadily diminishing use of the lower limbs as locomotor organs. Sometimes there was a history of trench feet, acute infective arthritis or gonorrhœa. In a typical case complaint was made of pain and callosities in the sole of the forepart of the foot, of corns on the toes, of cramps in the legs and feet, and, if there was a gonorrhœal influence, of progressive wasting of the legs. There was hyperextension at the metatarso-phalangeal joints that could be reduced by manipulation in all but severe cases, but not by the patient's active effort. The middle phalanges were acutely flexed on the first, and the apex of each angle was capped by reddened, thickened skin or an actual callosity. The little toes were usually very distorted and they closely approximated neighbouring digits. The skin of the forepart of the sole was greatly stretched; it might be thinned or thickened. There might be one large callosous plaque over this area, or there might be a number of callosities, each opposite a metatarsal head.

In the early stages daily corrective exercises, manipulation of the toes, the wearing of a corrective splint at night and the application of metatarsal bars to roomy, low-heeled shoes might stay the progress of the deformity and keep the patient comfortable. But once the deformity was firmly established, operation offered the only chance of permanent relief.

At operation the tendon of the *extensor hallucis brevis* muscle was divided and a segment removed from the *extensor hallucis longus* tendon and its sheath divided. Then, after the soft tissues had been removed from the head of the first metatarsal and the base of the first phalanx, the latter was levered into its normal relation with the metatarsal bone and forced into flexion. The second, third and fourth toes were similarly dealt with. The proximal phalanx of the little toe was removed subperiosteally. The next step was to carry out the usual procedure to secure fusion at the interphalangeal joint of the great toe and the proximal interphalangeal joints of the second, third and fourth toes. At the completion of the operation the first four toes were fixed in correct position by separate moulded splints of sterilized aluminium. The splints were fastened by bandages of ribbon gauze soaked in compound tincture of benzoin. No other dressing was applied. A light plaster slab was moulded to the sole and a light cast, reaching to the ankle, but not to the toes, was applied to the dorsum. The ankle

was freed after a week or ten days; but the splints to the rest of the foot were not disturbed for six weeks. The patient was then allowed to walk in slippers, with a pad of felt just proximal to the metatarsal heads, and was instructed to practise flexion at the metatarsophalangeal joints. Ordinary walking activity was gradually resumed. Care had to be taken in the selection of shoes, as the toes were lengthened as a result of the operation. The foot splint should be worn every night for six months to overcome the contraction that was apt to accompany the gradual resolution of scar tissue resulting from the extensive operative procedure.

Dr. N. S. GUNNING (Adelaide) said that in order to have normal function full use of the toes must first be made possible, and in the final act of each step the toes must be able to grip the ground and thus save the foot from pathological change. In Dr. Gunning's opinion this full function of the toes should be made possible before any pathological condition of the foot was attacked.

Dr. Gunning's experience of the method of treatment given by Dr. Glissan had been limited, but it seemed to be very sound in principle; at the same time it had quite a number of difficulties, not only in that of the operation, but especially in the after-treatment. Careful thought had to be given to this treatment before it was carried out.

First, as to the operation itself, Dr. Gunning found that the separation of the capsule was quite difficult; the stripping of the periosteum up as far as the joint was fairly easy, but, owing to the way in which it became incorporated with the bony structure close behind the joint line (in an irregularly roughened surface), this separation was quite difficult. The separation was made easier, of course, if some roughness and force were used with the periosteal elevator; but it is in this operation in particular that careful and delicate surgery was required, for the greater the trauma, the greater the resultant fibrosis, and hence the delay in recovery and the possibility of failures which would occur owing to the inability to regain flexibility and early function. Therefore, in this stage of the operation Dr. Gunning considered that the separation of the periosteum and capsule should be made by very careful dissection. Whether it was necessary to separate the capsule on both sides of the metatarsophalangeal joint he was not sure. If the separation of the capsule was sufficient in the metatarsal side of the joint—by that Dr. Gunning meant complete dissection so far round the sides of this bone that the only attachment left was on the posterior surface—this would then give sufficient mobility of the toes to allow them to be placed in the desired corrected position.

Dr. Glissan had stated that he worked without a tourniquet, but Dr. Gunning saw no reason why a tourniquet should not be used. If it was used, however, the hemorrhage had to be completely controlled before suture of the wounds; this again saved as much resultant sclerosis as possible, and it would also give a shorter operative period. The division of the tendons of the smaller muscles of the foot was essential, and especially the complete removal of the hallucis tendon.

Dr. Gunning then referred to attempts to obtain bony union at the proximal interphalangeal joint. Dr. Glissan had relied on the simple clearing of the cartilage and splinting. Dr. Gunning had tried the insertion of a small bone head to facilitate more early and certain arthrodesis of this joint. The peg was inserted through the middle phalanx commencing from the distal joint, the peg passing into the proximal phalanx. The terminal phalanx was thus stabbed onto the small protruding portion of the bone peg. This, however, was not easy and took time. A short stainless steel wire could be inserted into the proximal phalanx after the cartilage was cleared and enough could be cut off to allow the middle phalanx to be pulled over this and stabbed into the bone. This had been done in the arthrodesis of two of the small bones of the wrist with success. Dr. Glissan was particular about after-splinting, but the application of the splints to the dorsal surface seemed to Dr. Gunning to be quite satisfactory.

He asked Dr. Glissan why he preferred to place the splint on the under surface of the foot.

Dr. L. O. BETTS (Adelaide) said that partial exposure was not satisfactory. He had found the stripping referred to by Dr. Gunning difficult, and used the scalpel to dissect parts. He could not understand how Dr. Glissan got the metatarsophalangeal into flexion with a sole splint. He used a dorsal plate.

Dr. H. R. POMROY (Adelaide) asked Dr. Glissan whether the operation resulted in dropping of the anterior heads of the metatarsals. The flexors of the toes acted on the interphalangeal joints, whereas the long extensors of the toes acted on the metatarsophalangeal joints alone. To ankylose the interphalangeal joints he commended the use of a small intramedullary bone peg. When the peg was used, the patient could get about within two weeks.

Dr. D. O. BROWN (Melbourne) questioned whether Dr. Glissan's procedure could not be simplified. The essential thing was the liberation of the lateral metatarsophalangeal ligaments. He had seen several bad cases in children and never did more than an arthrodesis of the interphalangeal joints (Higgs's method), and then, if necessary, divided the extensor tendons and divided the lateral metatarsophalangeal ligaments.

Dr. C. W. B. LITTLEJOHN (Melbourne) said he had attempted Dr. Glissan's operation, but without success. He had found difficulty in separating the structures, and even if he had succeeded in that, had still had difficulty on account of the shortening of structures and the shortening of the skin. In seven cases he had removed the proximal phalanges. He did not think that in filleted cases the patients had much spring in their toes. He overcame the shortening of capsular structures by excision of fibrous material; the lateral ligaments in the adult were less important than the thickened dorsal capsule.

Dr. GLISSAN, in reply, stated that he operated without a tourniquet as there was little bleeding and rarely any need to tie vessels. Regarding the use of a bone peg for ankylosis, the time factor was important. An operation on two feet might take three hours, and pegging would add to the time. The proportion of cases in which ankylosis was not obtained with his method was small, and even if one or two joints failed to ankylose, it did not lead to difficulty. He considered that sole splinting was more efficient than dorsal splinting. He had never used dorsal splints because they would prevent the application of the felt pad. He found that when good correction was obtained the power of flexion at the metatarsophalangeal joints was marked even within a few days of operation.

Replying to Dr. Brown's suggestion of simplification, Dr. Glissan said that the operation was based on the pathology of the condition as he saw it, and he found that division of all of the contracted tissues gave the best results. Mere division of collateral ligaments would not be sufficient. He did not tenotomize the *extensor longus*, but took out a section of it in order to prevent any extension of the joints. In walking, the push off the ground gave sufficient dorsiflexion. He stated that there was often difficulty in stripping the metatarsal head, but he used a specially sharpened osteotome. He did not always strip the base of the phalanx if correction could be obtained without it.

Replying to Dr. Pomroy, Dr. Glissan said that the anterior arch did fall, but practically it did not cause trouble. If the condition could be passively over-corrected he continued conservative treatment for six months.

He thought that Dr. Littlejohn had perhaps been unfortunate in meeting very difficult cases. He had in one case divided the skin transversely and in another case stretching of the skin led to the development of gangrenous patches. He found that gradual stretching of the skin was usually adequate, but the condition of the skin was one of the difficulties in dealing with older people.

Low Back Pain: Sacro-Iliac and Lumbo-Sacral Conditions.

Dr. CHARLES LITTLEJOHN (Melbourne) read a paper dealing with low back pain. He said that owing to the

restriction of time only chronic sprains of the sacro-iliac and lumbo-sacral joints would be considered. These chronic sprains were, he pointed out, common causes of persistent low back pain. The sacro-iliac lesion was frequently accompanied by referred pain in the buttock and along the course of the peroneal nerve. The lumbo-sacral referred pain was usually towards the front of the thigh. These pains were not due to any interference with the nerve as such, but were referred from the area of low sensitivity to an area of higher sensitivity supplied by the same segmental nerve.

The ideal treatment of all acute sprains was as follows: A limited period of rest was required to allow the sealing off of damaged vessels—a period of forty-eight hours was enough. Then graduated active movements of the joints were necessary to ensure healing of the ligaments without the formation in their bundles of painful tangles. The recession of the pain threshold indicated the rate and degree of improvement. Chronic sprains, if of moderately recent origin, for example, up to one or two months, might be treated by graduated active and assisted movements. Sprains of longer history should be converted into acute sprains by manipulation, generally under anaesthesia, and then treated as such. The treatment of sacro-iliac and lumbo-sacral sprains conformed to the above rules.

Prolonged immobilization in plaster of Paris would relieve pain in many cases, but left healed tangles in the ligaments, with consequent limitation of movement and an increased vulnerability to further sprains. If all these measures failed, the joint should be fixed by operation.

The sacro-iliac sprain occurred more commonly in the narrow-backed, long-limbed viscerotonic type of person. Sacro-iliac sprains due to child-birth might occur in any type. The usual lesion was caused by a lifting movement of the trunk on braced legs, and in right-handed men was more common on the left side. Typically the spine leant away from the affected side, there was loss of the normal lumbar lordosis, standing flexion was limited by pain, and sitting flexion was free. Lasègue's sign was present at low angles on the affected side and at a somewhat higher angle on the unaffected side. X ray examination revealed no abnormality.

The lumbo-sacral lesion was more common in the broad-backed, herbivorous type of person. It was caused by a forced extension at the lumbo-sacral junction. Typically the spine leant away from the affected side, standing flexion was limited by lack of movement in the lumbar spine, and sitting flexion was similarly limited. Extension was painful. Lasègue's sign was present only at high angles.

Dr. Littlejohn gave details of appropriate exercises and of the various manoeuvres of manipulation; he also discussed briefly the indications for, and technique of, operative fixation.

Dr. S. SCUGALL (Sydney) said that the pathology of sprains of the sacro-iliac and lumbo-sacral joints had been defined as "damage to the inelastic limiting ligaments", caused by an abnormal excursion of the joint, and the damage would consist of contusions with tearing of fibres or bundles of fibres. In practice, however, there was more often associated muscle trauma, due to the same causative factor as the sprain, or the voluntary effort to splint the damaged joint, and there might even be tearing of the periosteum in the more gross degrees. Occasionally the degree of trauma might be trivial and this suggested the possibility of trigger action with its bearing on treatment. Sprain might be closely simulated by acute inflammatory conditions of the soft tissues which the patient might attribute to movement occurring at the time, and in the so-called "chronic sprain" there might be any one or more of the full range of associated systemic causation, the exclusion of which was attended with much difficulty.

The method of treatment of all sprains at these two joints by active movement after one or two days, and at first with some support, was satisfactory in the many cases in which the ligamentous damage was small. This did not hold when the degree of ligamentous damage permitted an abnormal joint range. In the many gross cases the severity of pain on attempted movement would render this

mode of treatment difficult. "Tangles" or adhesions among the bundles might still form with active movement. Irritation by stretching or tearing of the early stages of healing could well cause increased exudate. For these reasons immobilization with rest was desirable in major degrees of sprain. In practice the neutral position was adequate, and restricted exercises were later possible in recumbency for the maintenance of tone, and these exercises were continued when restriction was removed. The time factor in gross degrees was determined by organization of scar tissue, and if freedom from malposture could not be maintained continuously in the erect position, with support if necessary, ambulatory treatment was not indicated. Under these conditions the degree of shortening was such that active movement or assisted stretching was in the majority of cases successful in restoring full and painless function.

The term "chronic sprain" to define any limitation which might follow immobilization was not a happy term. Sprain had been defined as resulting from the excursion of a joint through an abnormal range, so that a chronic sprain might signify the habitual movement of a joint beyond its normal range. Precisely the opposite was what generally occurred after immobilization. True chronic sprain might conceivably follow lack of immobilization in a gross case. In the small proportion of cases in which gradual stretching was insufficient following immobilization, the subsequent manipulation need not initiate the condition of acute sprain. The aim at this stage was to stretch or rupture only such adhesions as were limiting a normal range of movement. Since under these conditions adequate ligamentous splinting was still present, the reformation of the adhesions might with safety be prevented by a full range of active movement. Nor was there, in general, after manipulation the frequently associated muscle trauma of the original sprain.

The manoeuvre of springing-the-joint had a place in the procedure. Adhesions were not excluded as a possible cause for pain in the presence of full movement and good posture. An adhesion might only reach the stage of painful stretching at the limit of movement, but by springing the joint in an appropriate direction to stretch such an adhesion the condition of sprain should not be reached.

The need for prolonged immobilization in plaster as a last resort might occur in the presence of ligamentous laxity, in other words, in those cases in which some longer fixation might have been used as an early measure.

The patient who rested in bed with a sacro-iliac sprain and who did not have either adequate immobilization or regulated activity, most frequently developed the associated sciatic scoliosis which in its origin might be a relief attitude. But it was not possible for a normal person to assume these relief postures in forward flexion or lateral deviation without the early onset of backache. Sometimes the posture became a "habit mal-posture", and remained when the primary lesion had healed. In these cases pain might be considered as primary, referred and secondary. This secondary pain, due to mal-posture, clouded the issue and might readily be excluded by a jacket in correction. In well-developed persons it was common to find immediate relief. In some of these cases the only lesion was mal-posture and the relief was then permanent. When relief was not complete, analysis was less difficult after the exclusion of secondary pain.

In the differential diagnosis of sacro-iliac lesions Dr. Scougall was accustomed to attach particular importance to hyperextension of the ipsilateral hip after the pelvis had been fixed, but diagnosis was frequently difficult.

In the actual manipulation of these joints no great force had been used, nor did Dr. Scougall think it necessary to do a full range of movement in each direction in every case. The essential movement was that which was limited by pain.

Procedures directed to the soft parts, such as fasciotomy and muscle stripping, constituted an attack on mal-posture. It had been computed that probably 60% of people over forty years of age were potential subjects for backache. Dr. Scougall had been impressed by the infrequency of cases in which sprain was the sole cause and

by the proportion of intractable cases following sprain which ultimately showed some other adequate cause, such as osteochondritis, not recognizable earlier.

Definition of the scope of procedures on the soft parts and further knowledge of nuclear lesions in which posture did not necessarily play a part would diminish the field of doubt in intractable types and help in the clarification of indications for stabilization and joint resection. But greater knowledge of the mechanism of posture had brought recognition of its increasing importance as a fundamental cause in the majority of cases, and the treatment of these conditions was predominantly conservative.

DR. D. J. GLISSAN (Sydney) said that he believed that the sprained and dislocated joint should be moved at the earliest opportunity by the patient's own effort. Early movement was the best treatment when no subluxation was present and the degree of damage was not gross. Patients were best kept on their feet and he was opposed to putting them to bed. The use of strapping had a definite value, as it provided local rest and gave the patient something to think about besides his pain. It did not immobilize the back very much, and the patient was usually glad to have it removed and to begin active exercises. In late cases with sciatic scoliosis and pain running down the limb he believed in and practised rest. If scoliosis was present, he gave an anæsthetic and, after manipulation, put the patient in a plaster spica from the lower part of the thorax to just below the knee. In twenty-four hours the patients had lost their pain, and after one month's rest in bed he freed the knee-joint and encouraged movement. The patient was then allowed up and resumed his ordinary activities with the plaster *in situ* for three months. After that he encouraged exercises by swimming. He said that he had been lucky, as apparently no cases of nuclear protrusions had occurred in his practice. Nuclear protrusion was an important question to be seriously considered in diagnosis. He felt that the danger of possible after-effects from lipiodol injections had to be considered and some of the Sydney neurologists did not think it was quite harmless. There were several factors in the ætiology of low back pain; the age of the patient was important. If a boy or girl of from fourteen to sixteen had low back pain a more serious lesion than a sprain was probably present. Most cases of sprain occurred in patients over twenty-five years of age. He agreed with Dr. Littlejohn that the type of back was important. He saw many patients from the wheat belt, long, thin, typical Australians, who had complained of pain after lifting bags of wheat. He questioned whether all cases were sprains. He thought there was an occupational backache seen, especially in over-worked, poor women. He wished to issue a warning against the use of too violent manipulation. Routine manipulation was to be deprecated, and he knew of a case in which the first lumbar vertebra in a woman had been badly crushed. X ray examination before manipulation was essential, especially after long immobilization, which might have led to bone atrophy. He agreed with Dr. Littlejohn on the value of swimming, from which great benefit resulted. The "Latex" rubber bed was an admirable invention and many patients were relieved by its use, especially those with nocturnal backache. The only operation Dr. Glissan used was Bell's, and the results were striking if the grafts took. Stability of the joints on both sides should be aimed at.

DR. JOHN HORTS (Sydney) agreed with Dr. Glissan that forced manipulation was risky and that nuclear protrusions might follow it. He knew of one case in which a hip had been dislocated during manipulation under anæsthesia. Several of his patients had complained more of the results of manipulation than of their original disabilities. He thought that in the lumbo-sacral type the combination of a Hibbs operation and an osteo-periosteal graft gave good results. He had not used Smith-Petersen's method, but in two cases Verrall's operation had been successful and also Campbell's bone chip operation.

DR. L. O. BETTS (Adelaide) said he did not believe in the existence of subluxation of the sacro-iliac joint which seemed to be too strong and too well supported by strong

ligaments to be capable of subluxation. Small's work seemed to put it out of the question in people over thirty, as in the third decade the joint began to degenerate with ankylosis, which became complete at fifty years of age and in many cases at forty. Referring to diagnosis, he said that the pain down the leg that Dr. Littlejohn had described was of fifth lumbar distribution and occurred in spondylolisthesis. He had never found points of tenderness outside the lumbo-sacral angle. Although many cures were referred to in the literature, he could not see that any apparatus could be applied tightly enough round the pelvis to immobilize the sacro-iliac joint. Lumbo-sacral joints could be immobilized with relief. Other patients had been cured by cutting of fascia or stripping of the sacro-spinalis muscle. In most of his cases trauma had not played a large part in causation. He agreed with Dr. Littlejohn that sciatic neuritis was a rare condition, but it had occurred. He had been interested in the question of nuclear extrusion, and Adelaide radiologists were now seeing cases with evidence of it. He asked whether the pathological change in lumbo-sacral cases was a peri-arthritis. In the American literature the lumbo-sacral joint was being discussed more than the sacro-iliac in cases of low back pain.

DR. R. B. WADE (Sydney) said he had not seen many cases, but personally he had a low set sacrum and suffered a good deal of postural low back pain accompanied by fatigue of the muscles supplied by the sciatic nerve. He had found the spiral spring mattress of great benefit.

DR. JOHN KENNEDY (Melbourne) said that he was speaking as a general surgeon who saw for an insurance company a large number of persons suffering from pain in the back. Dr. Littlejohn had operated on a lot of those patients with permanent benefit and the men had returned to work. He said that the treatment varied from year to year. Before the War, Robert Jones applied strapping until the tenderness had disappeared and then instituted active movements. In Melbourne, in a large group of cases in 1920-1925, the average period of disability was eight weeks. Then diathermy had become popular, and in 1930-1935 the average disability had risen to nine months. In one large insurance company the loss ratio had risen to over 100% in the late 1920's and in 1934 had reached 130%. The big loss had been in connexion with persons with low back pain and he blamed the universal use of diathermy. He discussed the non-traumatic backache and said that he had seen cases of low back pain due to congenital shortening of a lower limb, and in traumatic lesions of lower limbs sacro-iliac pain was common. He had never seen a case of lumbo-sacral or sacro-iliac strain in an adult without a septic focus in the upper air passages or teeth. In many non-traumatic cases no reason could be found for the obvious skeletal pain, but eradication of sepsis would cure 75%. In many of the so-called traumatic cases the patients would not completely recover until the septic focus had been eradicated. He thought that the ligament tore at its attachment to bone and that the lesion was really a periosteal one and not one in the body of the ligament. He had treated such cases by injection and bone drilling. He had seen patients with real sciatica and had operated on them, and in one case had found the sciatic nerve so firmly attached to periosteum that it had to be dissected away.

DR. A. G. ABBOTT (Perth) said that he was a general practitioner in a timber district and saw a lot of "low back" compensation cases. Quick recovery was necessary, as otherwise neurosis might supervene. The first essential was to abolish the pain. He had been struck by the fact that patients held the site of their pain with their hand. He had obtained good results by injecting the spot of maximum tenderness with quinine and ureahydrochloride. He then strapped the patient with a band made from a motor tyre. Inside the band he placed a football bladder and inflated it. Immediate relief followed. The air escaped during the succeeding two weeks and the patient recovered before he realized that the support had ceased to act. He thought that the question of sepsis was important and recurrence of pain could be lessened by removal of teeth

and tonsils. It had been found in Western Australia that it paid the insurers to meet the cost of eradicating septic foci.

Dr. E. B. M. VANCE (Sydney) referred to the detection of malingerers and the question of neurosis. He said that one method of detecting the malingerer or exaggerated introvert was to ask him to flex the back. The neurotic would not attempt to move, but the genuine sufferer could move to a certain extent. He considered that the importance of septic foci could be exaggerated.

Dr. LITTLEJOHN, in replying, said that he could not deal with all the questions raised, as he had prefaced his paper by stating that he was dealing only with a very small part of a very large subject. It was difficult, in many cases, to determine whether or not there had been trauma. Tumours of the *cauda equina*, inflammatory and other lesions, had to be considered. One of his patients suffered agonizing pain on hyperextension and lipiodol injection had revealed a block at the level of the third lumbar

vertebra. A tumour involving one of the sacral nerves had been removed at operation. Another patient had intractable pain from a myeloma of the first lumbar vertebra. He had seen two or three patients with nuclear protrusion, but none of them had yet consented to operation. In sacro-iliac cases cure could be effected in many ways, but operation produced a cure in six weeks, when other methods required months of treatment. He agreed that care had to be used in manipulation, especially under anaesthesia. Focal sepsis in traumatic cases was one reason for resistance of the lesions and chronic gonorrhoea might be an important cause of pain in the joints and ligaments. He had tried injection of local anaesthetics, but the results had not been very successful in cases of low back pain. The spiral spring bed was most useful, but with poorer patients, sleeping on an ordinary mattress on the floor gave good results. Malingerers were a bane, and he had found the "turning over" test useful. In answer to Dr. Betts, he said he had not seen a so-called sciatica in spondylolisthesis.

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Secretary: W. C. T. Upton, M.B., Ch.M., South Australia.

President's Address.

Dr. K. G. COLQUHOUN (Melbourne), in his presidential address, reviewed the knowledge of dermatology which had been achieved by the year 1870. A chair of dermatology was founded in England in 1869, and Dr. Colquhoun based his remarks on the inaugural lectures delivered by Erasmus Wilson in the following year. Dr. Colquhoun said that in classifying diseases of the skin Wilson used the headings "diseases of inflammation" and "diseases affecting function".

Under the first he placed various groups of affections. The first of these subdivisions included many conditions now classified very differently. Wilson considered that eczema accounted for one in every three examples of cutaneous disease. He included scabies, impetigo and exfoliative dermatitis in this group. The second or erythematous group of diseases of inflammation was a large one, and included erysipelas. The third group comprised the phlyctenous affections, which were represented by miliaria, pemphigus and herpes. *Dermatitis herpetiformis* was not mentioned, as it was not described until 1884. The fourth group dealt with the furunculous affections, and ecthyma, furunculus, hordeolum, carbuncle and anthrax were included in this group. In the traumatic group of diseases of inflammation were found eruptions associated with the presence on or in the skin of pediculi, pulex, demodex and harvest bug, and the stings of insects and some plants were also included. Under the heading of inflammation from specific poisons were found the exanthematous affections, but not syphilis, which belonged to its own subclassification. The final group dealt with diseases arising from specific constitutional causes, and included *lepra gracorum*, now known as psoriasis, and the strumous and carcinomatous affections. There was no suggestion of the tuberculous nature of either scrofuloderma or lupus, but Wilson considered that there existed an hereditary connexion between lepra and phthisis. It

was noted that the carcinomatous affections arose from lowered vitality and defective nutrition.

Dr. Colquhoun then spoke briefly of the diseases classified by Wilson as diseases of function. These comprised "nutritional aberrations", such as ichthyosis and angioma; neurotic conditions, such as hyperaesthesia; and chromatopathic states, such as chloasma, ephelis and leucoderma. The most interesting example in the group was that of the phytoses, which were described as aberrations affecting the epithelium, and it was remarked that the granular degeneration of the epidermic scales resembled in appearance and behaviour plants of the fungi class. Wilson was sceptical of this "vegetable doctrine", and his classification ended with descriptions of affections of the hair, nails and sebaceous and sweat glands.

After reviewing the progress made in the evolution of dermatology during the last sixty years, Dr. Colquhoun referred to the great influence of progress in chemistry, pathology and bacteriology, and concluded with a tribute to Wilson and his contemporaries, who did so much good work with very limited means.

Lupus Vulgaris and the Significance of Certain Non-Specific Eruptions in Relationship to Tuberculosis.

Dr. J. E. MCGLASHAN (Perth) opened his paper on *lupus vulgaris* by saying that cutaneous manifestations of tuberculosis had been recognized for seventy years. But there were certain lesions the origin of which was in doubt. Darier had enunciated certain postulates for the recognition of a cutaneous tuberculous lesion: (i) the presence of tubercle bacilli; (ii) the appearance of tuberculosis in a guinea-pig inoculated with material from the lesion; (iii) the occurrence of a focal reaction on the injection of tuberculin. Any of these was sufficient to warrant a diagnosis of tuberculosis. There were three further postulates, of which more than one had to be fulfilled before the lesion could be presumed to be tuberculous: (iv) confirmation of the histological appearances to those of lesions known to be tuberculous; (v) a certain clinical evolution and special aetiological circumstances; (vi) the

¹ The meeting of the Section of Dermatology with the Section of Paediatrics has already been recorded.

coexistence of undoubtedly tuberculous lesions. Darier referred to the lesions fulfilling all these postulates as "tuberculose"; to a second group of lesions, fulfilling only postulates (iii) to (vi), he applied the name "tuberculides". Dr. McGlashan also quoted Funk's classification, which was in accordance with the degree of the patient's immunity.

Dr. McGlashan said that *lupus vulgaris*, a major social problem in Great Britain and Europe, was uncommon in Australia; he had the impression it occurred less infrequently in Western Australia than in the eastern States. The site of the disease, near the body orifices and on places liable to injury, suggested that the infection was introduced by inoculation, possibly by autoinoculation, from sputum *et cetera*; but the appearance of multiple foci after measles indicated the probability of a hæmatogenous route. In the treatment of this disease excision was the method of choice. There were various other methods of treatment. Dr. McGlashan had employed treatment by digestion with astonishingly good results. He applied pepsin and a covering of "Elastoplast", changing the dressing at intervals of one week.

In discussing *tuberculosis cutis verrucosa*, Dr. McGlashan suggested that the tendency to warty growth might be due to a superadded infection by a filter-passing virus. He mentioned *tuberculosis calliuvata*, *tuberculosis fungosa cutis*, *tuberculosis cutis lichenoides* and *tuberculosis papulonecrotica*, then went on to discuss *erythema induratum*, which, in his experience in Australia, occurred in people who were otherwise in good health and had no history of tuberculosis. He discussed sarcoids, *granuloma annulare* and *erythema nodosum*, then approached the study of *lupus erythematosus*. The last-mentioned disease, he considered, was of more importance than most of those previously mentioned. In France, Austria and Switzerland *lupus erythematosus* was generally considered to be tuberculous; in Germany it was thought to have several different causes; and in England a streptococcal infection was regarded as the usual etiological factor. Certain observers declared that inoculation with material from lesions of *lupus erythematosus* was followed by tuberculosis in guinea-pigs. Darier stated that the enlarged lymphatic glands found in association with the disease were tuberculous. F. Engman, junior, considered that *lupus erythematosus* was a constitutional disease in which the erythema was secondary only. Dr. McGlashan had observed a young woman who had a generalized erythema, which had subsided, leaving patches of diskoid *lupus erythematosus*. On two occasions later she had suffered from the same type of generalized erythema. Dr. McGlashan had been unable to detect any differences between these rashes. He went on to say that, although the tuberculous connexion with *lupus erythematosus* was in dispute, he felt that the condition was an allergic reaction dependent on a previous tuberculous infection. He found chronically enlarged, possibly tuberculous, glands of neck and axilla more frequently in people suffering from this disease than in apparently otherwise normal people. He mentioned the rough eczematous patches frequently seen on the faces of young children and suggested that they were an allergic manifestation, and he speculated on the possibility that such children were potential sufferers from the allergic capillary reactions of *lupus erythematosus* in later life. Finally, he mentioned Scholtz's suggestion that one form of cutaneous tuberculosis might change to another according to time and the individual's powers of resistance.

Dr. R. R. WETTENHALL (Melbourne), in opening the discussion, said that many factors were concerned in the production of the lesions mentioned by Dr. McGlashan. The tubercle bacillus might be one link in the chain of circumstances resulting in the tissue changes that occurred; but he asked whether it was justifiable to regard it as the cause of the lesion. He thought that the tubercle bacillus was given greater importance as a causal agent than it merited. There were other factors that might be looked on as equally important. He mentioned the specific susceptibility of the tissues, remarking that tubercle bacilli from pulmonary lesions might

be distributed by the blood stream and yet cause no obvious lesion elsewhere. He thought that one reason why Australia was so free of *lupus vulgaris* and other superficial types of tuberculous infection was that the population was a selected one. There was no large number of ill-nourished people or people with poor constitutions; also the people were well clothed and had free access to air and light through the greater part of the year. The "primary complex of tuberculosis of the skin", described by Bruusgaard, was worthy of note. It might be followed by a number of lesions, the development of which would depend on the immunity of the individual and of the individual tissues as well as the virulence of the infection, the bulk of the infection and the situation. In discussing immunity, Dr. Wettenhall stated that owing to the present mode of living there were great numbers of people in a state of chronic exhaustion. In such a state allergic reactions were far more likely to occur. Vast numbers of people were suffering from fatigue allergy and infection. He had frequently noted pyorrhea in association with severe *lupus erythematosus*. If this sepsis was removed and quinine was given in the form of iron and quinine citrate and a dressing of quinine was applied to the lesions, great improvement took place. In the diagnosis of tuberculous lesions of the skin he suggested that quantitative tuberculin tests as described by Jadassohn might be employed with advantage in doubtful cases. It was questionable whether medical practitioners in the eastern States of Australia recognized tuberculous skin lesions as frequently as they might. Most of them had been trained in Australian medical schools and had not had the opportunity of seeing many of these lesions. On the other hand, men who had been trained in Europe sometimes made a diagnosis of tuberculosis without justification and perhaps overlooked certain conditions that were more common in Australia. In Western Australia the proportion of medical graduates from overseas was higher; this might account for the more frequent recognition of tuberculous skin lesions there.

Dr. Wettenhall drew attention to an article by Franz Blumenthal, in which the author expressed the opinion that all forms of tuberculosis depended on the state of immune or allergic reactions and that the degree of allergy determined the clinical type of tuberculosis, as modified by the localization and route of infection. Blumenthal admitted that the virulence, quantity and type of the infecting bacilli were important factors; but he said that in tuberculosis of the skin the features were more frequently determined by the reaction of the infected person than by the variability of the infecting organism. Blumenthal also believed that tuberculosis of the skin was often endogenous and that in many of the exogenous types there was superinfection. Further extracts from Blumenthal's paper were given. Dr. Wettenhall then went on to say that he had found radiation from a mercury vapour lamp the most useful form of treatment in *lupus vulgaris*. He had not observed enlarged lymphatic glands in association with *lupus erythematosus*; but he had not specially looked for them. He had found carbon dioxide snow of value in the treatment of the diskoid type of this disease. He said that Dr. Bell Ferguson had observed *impetigo sicca* frequently in a tuberculosis clinic in Victoria and had stated that the lesions reacted to the injection of tuberculin. Dr. Bell Ferguson had investigated over 1,000 patients recently discharged from this clinic and had found no cutaneous lesion that could be called tuberculous apart from this mild *impetigo sicca*.

Dr. K. G. COLQUHOUN (Melbourne) said that views previously held were again being adopted. Some years previously Professor Sir Harry Allen had held that *post mortem* examinations showed that most old people who had died of various diseases manifested evidence of having been infected with tuberculosis. Dr. Colquhoun had seen two cases of the erythematous type of lesion in dark people, but the great majority occurred in blue-eyed and fair-haired people. Recently he had seen two patients, both at the seaside, who had fallen and barked their knees, with the usual gravel rash ensuing. On this site there subsequently developed typical *granuloma annulare*.

He considered that cases of *granuloma annulare* were now more often seen than previously.

Dr. E. H. MOLESWORTH (Sydney) said that Dr. McGlashan and Dr. Wettenhall had made a difficult subject interesting, the difficulty being because of the relative rarity of tuberculides in Australia. Commenting on the question of more tuberculosis of the skin in Western Australia than in the eastern States, Dr. Molesworth said that he was sure that in the eastern States *lupus vulgaris* in native-born Australians was rare. Since 1910 he had seen only three cases. With regard to *erythema nodosum* and *erythema multiforme*, he considered *erythema multiforme* was not tuberculous; *erythema nodosum* had a similar relation to tuberculosis as was present in measles, namely, that it might lower the patient's resistance and so subsequent military tuberculosis might occur in either case. *Tuberculosis desquamatum* he considered due to a shower of tubercle bacilli infecting the patient. His training under Whitfield made him regard *lupus erythematosus* as a tuberculide. However, his experience in Australia had been that if it were a tuberculide, it was the only one that was common; and if that was so, why? Tuberculin reactions he considered valueless, because most people had had tuberculosis somewhere, and he thought that the great majority of old people might give a positive reaction; therefore, a negative would be of greater value than a positive result; hence this line of inquiry he considered hopeless. Everyone was struck with the fact that areas exposed to light were generally the seat of lesions; and Dr. Molesworth considered that there was some factor which caused sensitization to light, and that this precipitated the lesion. He was doubtful of *lupus erythematosus* being due in any way to tuberculosis. He thought it was a disease *sui generis*; at the same time some other disease, such as tuberculosis or a streptococcal infection, might provide the light sensitization factor. Since it was impossible to be certain, it was advisable to keep an open mind as to its causation. As regards *granuloma annulare*, he recalled that a late colleague who had it on his hands and later on his ears, and had often been completely investigated for tuberculosis over a period of many years, never showed any trace of tuberculous infection, and he eventually died of an influenzal pneumonia.

Dr. JOHN KELLY (Melbourne) wished to correct Dr. Molesworth in his opinion that *lupus vulgaris* was not existent in eastern Australia. He had recently shown three children in Melbourne who had been infected with tuberculosis, and typical *lupus vulgaris* lesions were present. All three children had been in contact with tuberculous patients. Another *lupus vulgaris* patient, who was in contact with a phthisical patient, was seen at the age of ten years; this child had had a lesion since the age of one year. A further patient of his had lesions of *lupus vulgaris* on the neck, almost a complete collar band, with others on the thigh and buttock. All of these children had done well with Kromeyer lamp therapy. Adults, in his opinion, did not do well with lamp treatment only, but needed something in addition, for example "Elastoplast" compression. Also he had seen primary tuberculosis of the skin producing an ulcer; bacteriological granulation gave negative results both by dark ground illumination and ordinary investigation methods; later the gland became enlarged, and on its excision tubercle bacilli were recovered from the gland. With regard to *tuberculosis verrucosa cutis*, he had just seen a patient sent from a sanatorium who proved to be suffering from *verruccosa pyoderma* and not tuberculosis. He was meeting an increasing number of cases of silk-stocking erythema with possible ulceration. The time of year for the incidence of these cases was the same as for that of Bazin's disease, and he wondered whether the two were not becoming confused. He had not seen Bazin's disease in the native-born Australian. It was rare in sanatoria to see tuberculous lesions of the skin, and possibly people with visceral lesions might not develop cutaneous tuberculosis. He could not accept *granuloma annulare* as of tuberculous origin, but thought it was occurring with greater frequency in children. Some of these cases cleared up spontaneously. Others were helped by iodine given internally. He would

not advocate X ray treatment; treatment by "Elastoplast", he considered, might be of use by exercising pressure. The relationship of *erythema nodosum* to tuberculosis was very dubious, although Dr. Bell Ferguson, he understood, considered that some association was possible. Sometimes *erythema nodosum* and *erythema multiforme* were seen in association, and the worst case of *erythema nodosum* he had seen was in association with acute streptococcal pyelitis.

Dr. J. W. FLYNN (Sydney) said that it was apparent that more tuberculosis of the skin was seen in Western Australia than in New South Wales. Dr. O'Donnell, of Perth, also surprised him with the number of cases that he had seen. Dr. Flynn had seen only two cases of *lupus vulgaris* in Sydney, and only two or three of *acne necrotica*; but he saw many cases of *lupus erythematosus* and an increasing number of cases of *erythema nodosum*. The incidence of tuberculosis in general was much the same in Australia as abroad. Therefore there must be some factor which kept it away from the skin and confined it to the internal organs. With regard to *granuloma annulare*, it seemed that the lesions were isolated and might be a local infection, but he would reserve his judgement.

Dr. R. C. E. BRODIE (Melbourne) recalled twin sisters, both of whom had had *lupus erythematosus*. One subsequently died of pulmonary tuberculosis; the other was thoroughly investigated without any signs of tuberculosis being found, and the skin condition cleared up completely. He disagreed *in toto* with the idea that *lupus erythematosus* was of tuberculous origin, and thought that light was of importance; he saw more of these cases during the summer than at any other time. He thought that tuberculosis was a rare complication in dermatology.

Dr. L. W. LINN (Adelaide) said that in South Australia *lupus vulgaris* was very rare in the colonial-born, and that *granuloma annulare* was also very rare. He had seen no case of *granuloma annulare* in Adelaide for many months, and thought there was no special relation to tuberculous infection, because tuberculosis in young females was greater in South Australia than in the other States. With regard to *lupus erythematosus*, apart from the influence of light, he thought that it might be a separate entity, and suggested that it should be so regarded.

Dr. W. C. T. UPTON (Adelaide) said that during the last ten years he had seen twenty-five cases of *lupus erythematosus*; only one gave signs of tuberculosis. He had seen some twenty cases of *granuloma annulare*, and wished to know if anyone had seen a similar type of lesion, which, he had heard said in New Zealand, was due to wool fibre; he had not heard of this elsewhere.

Dr. MCGLASHAN, in reply, said that the only consolation of a speaker was that he learned more from the criticism of his paper than he had given. With regard to treatment of *granuloma annulare*, he used Grenz rays with arsenic given internally; but he had found that some cases cleared up with "Elastoplast" only. His impression was that there was not enough evidence to say that direct infection was responsible for *lupus erythematosus*, but that there was a circulating toxin which rendered these people sensitive to light. With regard to the tuberculin reaction, regular tests were made, and when a positive reaction was obtained, X rays and other treatments were used, and apparently a positive result to a test was looked upon as showing activity. With regard to Bazin's disease, he had seen one patient who had had a papulo-necrotic lesion twelve months before the onset of Bazin's disease. *Erythema multiforme*, he considered, had no connexion with tuberculosis. In reply to Dr. Flynn, Dr. McGlashan referred to the view that 10% of patients with *erythema nodosum* developed phthisis within twelve months; this was not his experience in Western Australia.

The Treatment of Hamangiomas.

Dr. J. W. FLYNN (Sydney), before discussing the treatment of hamangiomas, described the processes which resulted in its development. He said that microscopically

the hæmangioma showed mature vessels and capillaries, but no undifferentiated cell mass or cords. Capillaries, larger vessels and masses of more or less fascicular cells could be seen in the vascular sarcoma. A soft, reddish tumour, growing slowly, was suggestive of hæmangio-epithelioma. Clinical diagnosis was sometimes difficult, as it was necessary to differentiate between simple hæmangioma and the other tumours. Seen microscopically, the mature capillaries filled with blood, the solid cords and the masses of cells of undifferentiated type were the diagnostic criteria. Colour and prominence became more pronounced after violent exertion, or if the circulation was impeded. Pulsford was of the opinion that hæmangioma and lymph-vascular angioma were potentially malignant, and expressed the belief that the hæmangio-endothelioma was an intermediate stage between benign and malignant angioma.

Concerning treatment of vascular nævi, Dr. Flynn said that it was essential that the nævus tissue should be completely destroyed and that there should be no disfigurement. Results varied with the type of nævus, and in the case of "port-wine stains" results were not often satisfactory. Raised hæmangioma were successfully treated by several methods, and spider nævi presented little or no difficulty.

Dr. Flynn then discussed the treatment of the various types. Electrolysis (for which cauterization might sometimes be substituted) was the best treatment for spider nævi. Carbon dioxide snow might be used if the pencil was small and fitted the body of the spider accurately; but radiation was of little value. Raised hæmangioma were treated in many ways. Cures were sometimes spontaneous, and often followed traumatization. X rays and radium were most effective when used early. Except in rare cases it was advisable to start treatment without delay, as some of the cavernous angioma spread and destroyed surrounding tissue. When many small lesions were present, success had been achieved by puncture and a few drops of collodion, which contracted as it dried and by exerting pressure on the tissues beneath prevented the reaccumulation of blood. Injection therapy had also been used, but results were not encouraging. It was important that the needle should be in the lumen of a vessel, or scarring might occur. Carbon dioxide snow was also used. The use of refrigeration, ignipuncture, electro-coagulation, injection therapy and other destructive methods was justified only in the treatment of very fibrous and radio-resistant or inconspicuous lesions. Dr. Flynn thought that radium was the best treatment.

He then spoke of *angioma cavernosum*, which was a vascular defect, usually found on the face or scalp. It usually appeared in the first year of life. It was a soft, solitary or diffuse tumour situated in the subcutaneous tissue and elevated above the skin surface. It was composed of dilated vascular channels, and surgical treatment was almost impossible because of the location and the extreme vascularity. Radium was of great value, for it acted upon the young, growing cell structure, inhibited growth, and the existing vascular tissue was gradually absorbed. It was important that treatment should be undertaken early. Some cavernous nævi were well treated by radium seeds, of which one application should suffice.

Dr. E. H. MOLESWORTH (Sydney) said that the doctrine, originating apparently in Edinburgh, that hæmangioma should be left until a comparatively late stage of the infant period was, in his experience, as unfortunate as it was widespread. It was quite true that in a small proportion (about 1%) of the cases spontaneous resolution occurred, or that in later life a prominent cavernous hæmangioma might flatten and approximate to a port-wine stain. But in most instances the area involved increased markedly and sometimes alarmingly, and resolution did not occur.

Several considerations had to be taken into account besides the mere increase in the area involved by the angioma.

In the first place, the epithelium covering these growths gradually became thinned by stretching in the course of

the months during which the angioma persisted, so that even if complete resolution of the tumour was obtained by treatment at a later period, the skin at the site often remained thin, papery and atrophic in appearance. In the second place it was true that hæmangioma were highly sensitive to radiation while they were actively growing, but when growth ceased this sensitiveness was greatly diminished. After a few years the blood vessels of which they were made up were little, if at all, more sensitive than normal tissue.

During the first six months, and preferably during the first month, of life, the nævus could be suppressed in most cases by a single normal tolerated dose of radiation. This insured that no obvious damage was done to the overlying and surrounding tissues, and after a year or two it was often impossible even to see where the nævus had been. If the child was between six months and one year of age when treatment was commenced, the radiation generally had to be repeated on several occasions. Partly owing to this multiplication of exposures and partly owing to the long-continued stretching of the overlying epithelium, it was only occasionally that the perfect result mentioned above could be achieved in such late cases. At greater ages still complete resolution of the hæmangioma was either impossible to achieve or was attained only at the expense of permanent marking of a cicatricial type. Moreover, it was obvious that if a mark was to be left at all, it was better that the mark should cover as small an area as possible.

Considering all these aspects, no other conclusion would appear to be justifiable than that which recommended the earliest possible treatment of these disfiguring growths.

In early cases the method for choice was undoubtedly radiation. Other methods, such as diathermy and the use of carbon dioxide snow, were much more liable to produce obvious and permanent scarring, and should be reserved for use in those patients who were brought for treatment only when the growth had become radio-resistant.

It did not matter whether radium or X rays were used, both were equally satisfactory, provided even distribution of radiation effect was achieved.

Owing to the very poor depth dose provided by a radium plaque, a nævus having a depth of half a centimetre or more could be dealt with more satisfactorily by the use of an X ray tube maintained at thirty centimetres distance. This could easily be made to provide 75% of the incident radiation at a depth of one centimetre. Personally, Dr. Molesworth preferred to use an X ray tube in all these cases, since the effects were never worse and often better (especially in deep nævi) than those obtained by a radium plaque. His reason for this preference was that the dose required was never more in early cases than a normal tolerated skin dose, which left no visible after-effects on the irradiated area. The delivery of the dose was also much quicker than with radium, and could be done at a low cost. But, provided due account was taken of the depth to which the growth had penetrated, anyone who had learned the simple principles of the use of a radium plaque could provide good results.

In Germany and America, Spilthoff, Wood and MacKee, and Fuhs and Konrad had used *Grenzstrahlen* for angioma and thought that for port-wine stain *Grenzstrahlen* were superior to other forms of treatment. Goldsmith used injections of sodium morrhuate, quinine and urethane and dilute hydrochloric acid. He found hydrochloric acid much the most satisfactory. The injection was made with a very fine needle as nearly as possible into the centre of the tumour. He generally began with 0.2 cubic centimetre of the dilute hydrochloric acid. Further injections were given only into any soft areas that remained when shrinkage had ceased. Goldsmith mentioned Silcock as advocating the use of 2% sodium morrhuate froth. One cubic centimetre of a 10% solution mixed with four cubic centimetres of sterile distilled water was drawn in and out of a syringe until the froth was formed. Enough was injected to produce moderate distension of the whole tumour. Dr. Molesworth said that he had had no personal experience with these methods.

Radium or radon implantation could be used, but provided certain dangers of hæmorrhage difficult to control in the case of hæmangiomas. As a rule highly filtered radium radiation from a distance of one to two centimetres was the best form in which radium could be used for angiomas, and should always be preferred to the use of a radium plaque unless the growth was less than half a centimetre deep. In any case, a radium plaque should never be employed unfiltered for treatment of an angioma. This was on account of the very bad depth dose obtainable without heavy filtration.

Dr. R. C. E. BRODIE (Melbourne) said that he was relieved to find both speakers advocating the disuse of sclerosing solutions. He would never consider using them again himself, except in cases involving mucous surfaces. Mention had been made of *Grenz* rays. He had had very considerable experience and was very disappointed with them; in fact, he considered that they did nothing but harm in hæmangiomas. He used radium screened with 0.6 millimetre of platinum, which filtered off 99% of the β rays, and he considered that it did not matter what filter was used, except that it was necessary to use the same rays. He used γ rays only, and considered that the unfortunate telangiectases sometimes seen years after treatment were due to a bigger proportion of β rays having been given. He had noticed the great preponderance of female to male patients.

Dr. W. GILFILLAN (Adelaide) had seen in London a case of globus tumour and was impressed that the results were out of all proportion to the lesion. The terminal phalanx of the index was wasted. The case was discussed at length and it was decided that excision was necessary. This was followed by complete recovery of muscle and also of sensation.

Dr. —. VERCO (Adelaide) said that he had had experience of many years and saw no reason why there should be an atrophic scar after treatment of superficial lesions. Some cavernous lesions, he considered, were better treated with interstitial application of radium; he had had no cause for worry as far as hæmorrhage was concerned after implanting radium in these cases. Late muscular atrophy was a possible sequela to the interstitial use of radium and did not become visible for several years.

Dr. J. H. KELLY (Melbourne) had tried electrolysis, using up to twenty amperes, but thought it was now a method of the past. He also considered the injection method gave either no result at all, or else an induration which faded, or else ulceration. Ulcerations were usually very painful

and the resulting condition was a tissue-paper scar with surrounding erythema. He agreed with Dr. Verco that an atrophic scar was not a necessary sequel to proper treatment. He usually treated hæmangiomas with radium and finished with carbon dioxide snow. Injection treatment of hæmangiomas about the lips gave bad results and resulted in tender scars or ulceration.

Dr. R. R. WETTENHALL (Melbourne) said that the historical outlook was interesting. He had seen hæmangiomas treated by radium by Dr. Wickham in Paris, of course by a plaque and unfiltered. If the condition was very superficial he saw no objection to using β rays, because the reaction was destructive and similar to that of carbon dioxide snow; excellent results followed. Dr. Wettenhall said that, in speaking of a destructive reaction, he did not mean ulceration or destruction of the tissues—rather the elimination of the naevoid tissue. Acupuncture was used in London with good results. Radiation could be applied to the head confidently and frequently. It was possible to remove the naevus without destroying the hair. He agreed that electrolysis was the most suitable method for spider naevi, although carbon dioxide snow was possibly better for the treatment of small babies, because its use did not require anaesthesia. If the angioma were not more than one centimetre in depth, why should γ rays be used when a result could be obtained with β rays? Dr. Wettenhall referred to a case in which fine telangiectases followed radiation and were cleared up very easily with carbon dioxide snow.

Dr. K. G. COLQUHOUN (the President), in summing up, said that he was very glad to see such unanimity of opinion, and considered that it was just a matter of individual choice of the type of filtration to be used. Radiation in one form or another was obviously the method of choice.

Dr. MOLESWORTH, in reply, said that it was possible to avoid atrophic scarring if patients were seen early enough. He emphasized the statement that it was not necessary to repeat treatment if the naevus was flattened down, as the remaining redness would fade in time and would not be followed by telangiectasis. Atrophy of muscle might be prevented by distance radiation; he had not seen a muscular atrophy, and since the dose needed in these cases was less than a dose destructive to a normal tissue, no atrophy should occur. He generally advised leaving spider naevi in young children until they were aged fifteen or sixteen, when the child would remain still and no anaesthetic would be necessary.

Section of Medical Literature and History.

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Secretary: Professor J. B. Cleland, M.D., Ch.M., South Australia.

President's Address.

Dr. L. COWLISHAW (Sydney) chose as the subject for his presidential address "The Development of the Study of the History of Medicine". He said that the first occasion on which a section of historical medicine was formed at an Australasian congress was at Sydney in 1930, when the late Dr. A. A. Lendon, of Adelaide, was president. The study of medical history might be traced back to the time of Celsus, the Roman patrician, who wrote an historical introduction to his book *De Medicina* about the beginning of the Christian era. The next medical historian did not

appear until 1506, when a distinguished physician of Lyon, Symphorien Champier, wrote the first series of medical biographies. Medical history might be said to have really begun with the publication of Daniel Le Clerc's "*Histoire de la Médecine*" in 1699. Le Clerc, while he was credulous and believed absolutely in the Old Testament fables of Noah and his ark, wrote much about the ancient physicians which was still worth reading.

The eighteenth century witnessed a remarkable extension of interest in the history of medicine. To this century was owed the first medico-historical journal, Wittwer's

Archiv für Geschichte der Arzneykunde, published in 1790. In England medical history was first written by a prisoner in the Tower of London. John Freind, becoming mixed up in Jacobite plots, spent some months there and occupied his time by beginning his "History of Physick", which was published in 1728. Freind's history was still of interest. Medical bibliography might be said to originate with the colossal labours of Haller. Haller was one of the greatest of physiologists and a universal genius. His work was carried on by the German historian Ludwig Choulant at the beginning of the nineteenth century and brought to completion by the work of Robert Fletcher and Fielding Garrison in the publication at the Surgeon-General's Library at Washington, United States of America, of the magnificent Index Catalogue, in which practically the medical literature of the entire world might be found classified scientifically.

The greatest of all medical historians, Karl Sudhoff, revolutionized the study of medical history. For thirty years a general practitioner at Düsseldorf, Sudhoff, on the foundation of the Historical Institute at Leipzig, became its director. Still working at the age of eighty-five, Sudhoff had produced innumerable articles. From this institute had gone forth all over Europe and the United States of America well-trained research workers, the most outstanding being Henry Sigerist, who was at the present time in charge of the Institute of History of Medicine at Johns Hopkins University, Baltimore. At Johns Hopkins Medical School the students received each year a course of lectures on the historical aspects of the subjects they were studying, and these lectures were supplemented by demonstrations of books and pictures prepared in many cases by the students themselves.

Undoubtedly in every medical school in Australia a short course of ten or twelve lectures should be given to students in their final year. In this way alone could the new graduate go forth with a knowledge of the great traditions of his profession, become familiar with the great men who had preceded him, and realize that progress in medicine did not begin in the nineteenth or twentieth century.

Dr. Cowlshaw concluded by making an appeal for the improvement of medical libraries in Australia. In Sydney, Melbourne and Adelaide a beginning was being made, but the pace would have to be greatly accelerated if the leeway of past years of neglect was to be overtaken.

The Early History of Tuberculosis.

PROFESSOR HARVEY SUTTON (Sydney) read a paper entitled "Some Notes on the Early History of Tuberculosis". He said that in dealing with the history of tuberculosis it was suggested that in prehistoric times some acid-fast bacillus from the grasses established itself in the cow and later, with the closer settlement made possible by the agricultural development in the great fertile river deltas and by the domestication of animals, a mutant bovine bacillus established itself in man. Many races living primitive lives appeared not yet to have made contact with this organism. The earliest specimen extant was vertebral tuberculosis in an Egyptian mummy of 3,000 years ago. The frequency and character of tuberculous infections in persons of from eighteen to thirty-five years of age, so typical of agricultural and pastoral life, were well known to the Greeks.

Hippocrates in his aphorisms, for example, "a spitting of blood and then a spitting of pus", had known both pulmonary and vertebral infections, though curiously he did not mention its contagiousness, which was held to exist by contemporaries. Aretæus gave an interesting description, and Galen suggested sea voyages and the use of milk.

After Galen the dark ages descended on Europe, and the first monograph from the clinical point of view had been produced by Richard Morton, "Phthisiologia", in 1678. Pliny knew potter's rot, while Paracelsus had described miner's phthisis; but Ramazzini (1700) clearly analysed occupational disease of all kinds, and inevitably tuberculosis.

With the industrial revolution beginning in the middle of the eighteenth century and the change to urban life, the proportion of deaths from tuberculosis to other deaths rapidly rose, just as was happening in Japan today.

Whytt, of Edinburgh, in 1768 described tuberculous meningitis. The name of Pott's was given to vertebral tuberculosis, "Pott's spine", and tubercles were described as such by Bayle.

Lettsom, following up "Seawater" Russell's ideas (1750), established the Royal Seabathing Hospital (1791) at Margate, which was still flourishing and which still dealt with the "strumous" and "scrofulous", who formed the main body of those with the "king's evil", for which the royal touch had been practised up to Queen Anne's time.

With the peak of tuberculosis of the early nineteenth century came the great Laennec, later to fall a victim to the disease; he did much to define and diagnose the condition by mediate auscultation (1819); Corvisart had just introduced Avenbrugger's use of percussion (1818). Louis at the same time (1825) studied statistically these cases; he noted the apical tendency. Noteworthy was the clear proof by Villemin in 1865 of the transmission of tuberculosis before bacteriology came into being.

The ideas of sanatorium treatment, suggested by Bodington in 1840, had been successfully put into action at Gerbersdorf by Brehmer in 1850.

With 1882 came Koch, who with new technical methods isolated and grew the tubercle bacillus and proved it to be the cause of the disease entirely known today as tuberculosis.

The Influence of Robert Koch on the History of Tuberculosis.

DR. KEMPSON MADDOX (Sydney), in his paper on the influence of Robert Koch on the history of tuberculosis, said that Koch had all the qualities that must in any sphere culminate in unusual success. Early in life he developed such a passion for collecting biological material as to make it clear that his life would be better spent in science than in the occupation chosen for him by his father—shoemaking. He took a medical course at Göttingen with the object merely of continuing his studies in biology. He had an intense desire to travel, born of an insatiable curiosity. This gave him opportunities in distant countries to study such diseases as cholera, rinderpest and sleeping sickness. His ingenuity and industry were revealed by the manner in which he devised his own instruments, adapted the Abbé condenser and diaphragms to microscopy, employed photography for recording his observations, invented special stains and media *et cetera*. He displayed courage in the face of the coldest opposition when he read his epochal paper on tuberculosis in 1882. This paper was a terse, logical and uninvolved recital of the facts. The stringency of his famous postulates revealed a rigid self-discipline that demanded proof of every fact presented.

With such a mental equipment it was small wonder that this man could solve the riddle of so many diseases, create a new science and discover the means of diagnosis and prophylaxis of tuberculosis. Koch's ideas were always directed towards any possible outcome of practical benefit. Not only did he see a problem clearly, but he devised technical means of solving it.

Koch enunciated the general principles of the control of tuberculosis, which had remained unaltered to the present day. He insisted on the need for compulsory notification, improved housing, the provision of adequate and special hospital accommodation and education of the people.

In 1890 Koch announced the discovery of tuberculin. Dr. Maddox said that in subsequent years tuberculin had proved of great value in diagnosis and in the lessons of immunity its use had taught.

Dr. Maddox thought that Koch's greatest legacies were: the description of the tubercle bacillus and its diagnostic significance, his own pupils, such as Löffler, Ehrlich, Kitasato and Welch, and, lastly, his scientific integrity and standards.

The papers by Professor Sutton and Dr. Maddox were discussed together.

PROFESSOR HARVEY SUTTON (Sydney) stated that Koch was a very great public health man. When investigating cholera in India, Koch had been impressed with the fact that many people, although carrying vibrio cholera organisms, did not suffer from cholera. In 1892 Koch demonstrated the existence of typhoid carriers and thus determined the existence of carriers in other conditions.

The older Bancroft, in 1884, spoke of the manner in which disease was often spread by certain vectors, but he did not understand the relationship of carriers to disease. One lesson that Koch had taught was the great importance of technique at the right moment, and also the value of looking for new methods of investigation.

DR. J. W. BROWNE (Adelaide) said that he had understood Professor Sutton to say that the great increase in the incidence of tuberculosis was due to urbanization of the population. Dr. Browne wondered sometimes whether the great increase in incidence during the eighteenth century was not due to a great wave of infection, similar to the waves of infection associated with other epidemic diseases.

DR. L. B. ELWELL (Brisbane) stated that he had listened with great interest to Dr. Maddox's paper. He had had considerable experience with tuberculin from a therapeutic point of view for the past eighteen years. He felt certain that the profession did not realize what could be done with tuberculin, and certainly did not realize that tuberculin was still the greatest asset in the treatment of tuberculosis of all types. When the members of the profession did appreciate its value, they would appreciate much better what Koch had done for the world. As one who had been in a position to appraise the therapeutic value of tuberculin, he would like to pay tribute to the genius of Robert Koch.

DR. A. A. PALMER (Sydney) said that there was no doubt that tuberculin when first introduced killed many people, and he was of the opinion that deaths still occurred from the use of tuberculin. He instanced a case of a young woman who had died recently in Sydney. She had been suffering from a pain in her hip and had been given a dose of tuberculin, the dose being that recommended by health authorities. *Post mortem* there had been no doubt about the diagnosis, both lungs being riddled with acute tuberculous inflammation; the acute spread was due, in Dr. Palmer's opinion, to the injection of tuberculin. He was of the opinion that no diagnostic injection should be given unless the lungs had been examined by X rays.

PROFESSOR HARVEY SUTTON, in reply to Dr. Browne, stated that it was true that hygienists were beginning to realize that there were long-period waves associated with different diseases, for example the great wave of leprosy, of plague and of smallpox. He thought tuberculosis might pass through a similar phase, but he did not think there was any doubt that the urbanization of the population had brought about great increase in the incidence of tuberculosis. Tuberculosis, of course, was like any other disease, such as typhoid fever; given suitable opportunity, a wave of infection would certainly appear.

The Coming of Medicine to Tasmania.

DR. W. E. L. H. CROWTHER read a paper on the coming of medicine to Tasmania. He said that the arrival of the well-equipped expedition of Baudin on the coasts of southern Australia had decided Governor P. G. King to proceed forthwith with the settlement of Tasmania. On September 7, 1803, Lieutenant Bowen had landed with his party at Risdon, and was followed in succession by Lieutenant-Colonel David Collins and Colonel W. Paterson at the Derwent and Tamar Rivers respectively. Mr. Jacob Mountgarret, R.N., who was on the establishments of Bowen and Paterson, had the honour of being the pioneer surgeon of the colony.

With Collins had landed William l'Anson as principal surgeon, Matthew Bowden first assistant surgeon, and William Hopley second assistant surgeon. All three were young men, the two former aged twenty-five years, and

Hopley (the only married man of the three) probably little if at all older.

Mention was made, Dr. Crowther continued, of conditions at Hobart Town and of the difficulties encountered in regard to supplies and the outbreak of scurvy. While there was very little record as to the activities in a professional sense of these early medical men, mention was made of their shortcomings, culminating in one case in suspension and a severe reprimand.

Owing to the preservation of some of the journals of the Reverend R. Knopwood, the first chaplain, there was given a first-hand account of the death and burial of Matthew Bowden. William Hopley, after returning to England, had come back to Tasmania, where, having resigned his commission as assistant surgeon, he applied for a grant of land. He had fared so ill as a farmer that at his death some years later his two sons were admitted (or authority was granted for their admission) to the male orphan institution.

Next to be considered was the first surgeon, not attached to the government establishment. Thomas W. Birch had arrived at the Derwent as surgeon to the English South Sea whaler *Duduc*. His ship having been condemned as unseaworthy, he had commenced business as a merchant, with the proceeds of a cargo of merchandise which he had brought with him. From 1808 each whaling season (May to November of the year) his ships were whaling off the Tasmanian coast. In the off season they went further afield for the fur-bearing seals. He had fitted out a five-oared open whaleboat, the *Elizabeth*, in December, 1816, to undertake the circumnavigation of Tasmania, and during this voyage Port Davey and Macquarie Harbour had been discovered. He himself helped to make a detailed survey of Port Davey. For his services he had been granted a monopoly of taking the valuable Huon pine from these harbours for twelve months. His brig, the *Sophia*, had been concerned in a bloody affray with the Maoris near Otago in 1817. In the same brig he had pursued, with a detachment of the Forty-Sixth Regiment, a body of convicts that had seized a government vessel and had made their escape to the Straits Islands.

In Hobart Town he had built the first brick house, Macquarie House, which, Dr. Crowther stated, was still in use. On his death in 1821 he was a very wealthy man and had made a place for himself in the history of the State as not only a very successful merchant and explorer, but, in the words of Lord Moynihan, as the first medical "truant" of Tasmania.

The Concoction of Spirits.

DR. E. F. GARTRELL (Adelaide) read a paper entitled "The Concoction of Spirits". He said that as tuberculosis was the main theme of congress he would review the progress in the physiology of the pulmonary circulation. He took as a basis for the ancient conceptions the views of Galen. The three main problems then were: (a) the cause of animal heat, (b) the meaning of respiration, (c) the function of the blood.

As blood chemistry was as yet unborn, they had in the time of Galen designated the active principles of the blood spirits, or all-pervading essences. These consisted of three types: (a) natural, controlling nutrition *et cetera*; (b) vital, supplying heat, energy and activity; (c) animal or psychic.

The vital spirits were formed in the lungs and left the ventricle by the admixture of blood, air and heat, and were distributed by the tide-like flow in the arteries. The blood necessary to mix with the air in the lungs was thought to be a small portion of the whole, travelling by the pulmonary artery and returning by the pulmonary vein. Heraclitus spoke of "Animating fire . . . something between air and flame penetrating and vitalizing everything". Aristotle mentioned pulmonary vessels and air passages running parallel so that the blood might receive the breath. Erasistratus subscribed to similar views.

It was thought by some that Leonardo da Vinci had a better knowledge of the pulmonary circulation, and possibly the systemic also, but from his writings it appeared that he still adhered to the theory of the tidal flow of

the blood. The views of Servetus were very similar, but it was evident that up to the time of Harvey no one, not even Columbus, imagined that the whole of the circulating blood passed through the lungs, nor did anyone conduct or observe sufficient physiological experiments to prove the theories. However, even Harvey himself eventually denied the 2,000-years-old doctrine of concoction because he found no air in the blood after inflating the lungs with bellows. Eight years later Lower's experiment had restored it. Malpighi had completed Harvey's work by discovering the capillary circulation of the lungs.

DR. L. COWLISHAW, the President, said that it always appeared to him strange that medical science should have progressed up to the time of Galen and then should have stopped still for over 1,400 years. He wondered often, when he looked back to the time of Galen, whether present-day medicine was not now at the apex of a period of progress, and whether in the future practitioners would be faced with a period in which very little or no progress would be made. No doubt the Roman people felt in regard to medical science as secure as present-day practitioners did. It would appear that Galen came very near to solutions of the problems of respiration and circulation, but he just failed to solve them; nor was anyone during the next 1,400 years able to offer solutions. The great success of Galen was due to the fact that he was accepted by the Church owing to his theological studies, whereas most other workers were not accepted.

The Evolution of Public Health Legislation in South Australia.

DR. A. R. SOUTHWOOD (Adelaide) presented a paper on the evolution of public health legislation in South Australia. He said that health legislation in South Australia had largely followed English precedents. Dr. Southwood reviewed broadly the development of the health laws in England. The Reform Bill of 1832 had soon been followed by the *Municipal Corporations Act* and other acts which, by instituting a sound system of local government by elected authorities, established the basis of present-day public health administration.

Chadwick, Southwood Smith and John Simon had played prominent parts in the early developments in Britain. The General Board of Health, established in 1848, was modified in its constitution, and was later replaced by the Local Government Board in 1871. The Ministry of Health in 1919 took over the functions.

In South Australia the first *Public Health Act* had been passed in 1873. It dealt mainly with sanitation and the control of nuisances. Objections had been raised in parliament that the liberty of the subject would be unduly interfered with and that the expense would be too great. These objections had been overcome, and the system of health administration in the colony had been established. It provided for a central controlling authority (the Central Board of Health) to superintend the execution of the act, and for each town council to be a local board of health, with the duty of carrying out sanitary work in its area. The *Health Act* of 1898 had been a more comprehensive measure, and its provisions had been incorporated in the *Health Act* of 1935, largely a consolidating measure.

Dr. Southwood reviewed the various difficulties that had arisen in the early years of the State's history, and referred to the opposition made to such innovations as the notification of infectious diseases, and especially to the notification of cases of pulmonary tuberculosis. Official interference had often been resented, but it had eventually been agreed that public health was a proper and fair sphere for government interference and that some slight curtailment of individual freedom had to be tolerated. Health was a public asset, its promotion a public duty.

DR. L. COWLISHAW (Sydney) said that he often thought that he would like to know what were the first steps taken to deal with sanitation in the colonies in the early days. It was a remarkable fact that the public often objected to the introduction of legislation for improving the health of the community. He would like to see more papers written dealing with the early history of medical services in Australia.

PROFESSOR J. B. CLELAND (Adelaide) said that he had often been surprised at the great foresight shown by medical men in the early days of colonization. He was particularly interested in the reference made by Dr. Southwood regarding Dr. Chadwick, as he had in his possession letters written by Dr. Chadwick to his maternal grandfather, Dr. Burton.

Dr. J. P. Litchfield.

A paper written by the late Dr. A. A. Lendon and entitled "Dr. J. P. Litchfield, the First Inspector of Hospitals of South Australia" was read. The paper was a description of the Australian career of John Palmer Litchfield, who arrived at South Australia in 1839 with his wife and family. He was not a regularly educated or legally qualified medical practitioner, for he had not passed through any professional college in Great Britain or Ireland. His degree, probably M.D., was obtained at Heidelberg. In 1834 he was physician to the Westminster General Dispensary. In 1836 he was recognized as a teacher by the College of Surgeons, and lectured at the Blenheim Street School of Medicine.

After his arrival in Australia, John Litchfield established a practice at Adelaide, and in the same year he became honorary inspector of hospitals for the province, which at that time had but one infirmary, a hut eighteen feet long and twelve feet wide. Soon afterwards he was appointed chairman of the board of management of the infirmary, and with characteristic indiscretion he immediately dispensed with board meetings. He was apparently entirely lacking in tact and somewhat irascible, for his career was marred by quarrels, of which one at least was violent.

Included in the paper were interesting details of the varied activities of its subject. He superintended the vaccination of newcomers to the colony, and did active and useful work in connexion with the combating of smallpox. For a time he was coroner in Adelaide. He lectured on the natural history of South Australia at the Adelaide Literary Association, subscribed to the Botanic and Horticultural Gardens, and was directly and indirectly responsible for innovations and reforms in public health administration.

The most important section of the paper dealt with John Litchfield's work for the infirmary. He wished to secure adequate financial provision and a new and permanent building. His plans were adopted and the hospital was opened early in 1841. Had his tact only been equal to his zeal, Litchfield might have made for himself a great name in the medical history of the State; but to work with him was impossible. He was given no position at the new hospital, and the office of inspector was abolished. He had in the meantime secured a "club" of almost two hundred workmen and had become involved in all manner of medical and surgical work. His practice flourished.

At that time (1841) insane patients were housed in the Adelaide jail, and Litchfield drew the attention of the Governor to plans for making better provision for them. Encouraged by tentative promises of assistance, he engaged a house and a cottage for convalescent patients, but the government had no available money and did not recognize his qualifications. With the sudden withdrawal of the expected support, Litchfield found himself in serious financial difficulty, which culminated in a sojourn in the debtors' prison. After his release he sought minor government positions, which he failed to secure, and left Adelaide. It is believed that he was superintendent of a private mental hospital in England until 1855, when his name appears in the early history of Kingston, Ontario. The paper concluded with an extract from an article by Professor Gibson, of Kingston, in which Litchfield's name was mentioned as a teacher of midwifery and physician to criminal insane patients. He died in Ontario in 1868.

Some Early References to Tuberculosis in Australia.

PROFESSOR J. B. CLELAND (Adelaide), in a paper on some early references to tuberculosis in Australia, pointed out that in the early days of Australia some people came out

definitely for health reasons, others left the old country apparently well, but had contracted the infection before they left, and still others were brought out by force (transportation) whether they were suffering from tuberculosis or not. Thus Australia had received its original infections.

The first white man buried in eastern Australia, one of Captain Cook's sailors, had died from consumption. Joseph Gerrard, one of the Scotch "martyrs", transported in 1794, died of this disease in 1796, and a number of prominent immigrant persons had so suffered in the various States. In South Australia during the centenary celebrations, much interest was centred on Colonel Light,

and a play which was performed graphically portrayed his death from tuberculosis, presumably from a fatal hæmoptysis. This led to a search of the early accounts of Light and his illness, and through Miss Penelope Mayo all the details that were available had been got together. These showed unquestionably that Colonel Light died from pulmonary tuberculosis, though not in the dramatic fashion figured in the play.

The Early Register of South Australia.

PROFESSOR J. B. CLELAND (Adelaide) read a paper on the first fifty-two names in the medical register of South Australia at the end of 1849.

The Trade Exhibition.

THE Trade Exhibition Committee had at its disposal several rooms in the Department of Engineering. Space was allotted to various firms. The following is a short account of the several exhibits.

F. H. FAULDING AND COMPANY, LIMITED, gave practical demonstrations of the painless removal of adhesive plaster by using "Solyptol" antiseptic. Undiluted "Solyptol" allows all types of plasters to be peeled off the skin with ease. Unlike ether, "Solyptol" is non-inflammable and very agreeable to the patient, and will certainly replace the former for this purpose.

Microscopic examination of cod liver oil emulsions showed that "Milk Emulsion" had extremely fine and most even-sized globules of cod liver oil. The manufacturers hold that for this reason "Milk Emulsion" is more digestible, better tolerated and more palatable than ordinary cod liver oil emulsions.

The well-known infant feeding products of this firm, such as "Lactone" syrup, farinaceous food and "Vi-Milk", were prominently displayed. Of particular interest in this section was a chart showing the comparative acidity of the gastric contents of infants when fed on breast milk, "Lactone" syrup milk, and ordinary cow's milk respectively. It was explained that infants fed on "Lactone" syrup milk had the same acidity of the gastric contents as when breast milk was used, and that this accounted for the ease with which the highly nutritive "Lactone" syrup milk was digested; infants, when given "Lactone" syrup milk, had a greater resistance against infection and were free from nutritional disturbances. The manufacturers claim that "Lactone" syrup milk suits 95 out of every 100 infants.

A stable preparation of an intimate mixture of glycerine and dehydrated magnesium sulphate, under the name of "Magnoplasm", has during the past few years proved valuable in the treatment of carbuncles and septic conditions.

Other productions from the Faulding laboratories were also displayed.

ORGANON LABORATORIES, LONDON, had a display of preparations. It was explained that Professor E. Laqueur, Pharmacologist to the University of Amsterdam, and Professor L. K. Wolff, Professor of Hygiene to the University of Utrecht, were responsible for the control of the Organon Laboratories. In this way the maintenance of maximum therapeutic efficiency was assured. Every hormone preparation displayed on the stand had been assayed for potency and standardized before leaving Organon laboratories.

"Pregnyl", the gonadotropic hormone, valuable for the treatment of cryptorchidism, was available in two strengths, of 100 rat units and 500 rat units. Characterized by its action on the ovaries and testis, it is held to cause follicle ripening and especially luetinization of

the ovary, and to hasten the onset of endocrine function in the testis.

"Menformon", the oestrogenic hormone, and "Dimenformon" or oestradiol benzoate, a derivative of "Menformon", were shown in tablet form for oral administration, and solution in ampoules. The highly purified *corpus luteum* extract, "Progestin Organon", standardized biologically on immature rabbits, had been reduced in price to a little more than a quarter of the original, owing to the use of whales as the source of this hormone. It was pointed out that the new "Pernaemon Forte" used in the treatment of pernicious anemia was a 1937 achievement in chemistry; it is painless on injection. Information on any of the "Organon" products is obtainable from the Australasian agents, F. H. Faulding and Company, Limited.

LONDON HOSPITAL LIGATURE DEPARTMENT had a stand on which London Hospital catgut was displayed. Physicians and surgeons were able to see in a photographic album the processes of preparing this well-known catgut from the lamb to the sterile tube ready for immediate use. The London Hospital, members were reminded, has given close attention to the preparation of ligatures, and with the assistance of the surgeon, the bacteriologist and the chemist has exhaustively surveyed the whole of the methods available. The perfect ligature can be obtained only by the commencement of antiseptic preparation immediately the intestine is removed from the animal, and, further, the separation of the muscular layer and the mucous layer from the submucous coat of the intestine must be carried out under completely aseptic conditions. London Hospital catgut is made only from lambs reared on virgin British soil and subject to certified *ante mortem* and *post mortem* examination. Further, the intestines are thoroughly cleansed and frozen within two hours of the animal being killed, the growth of bacteria thus being reduced to a minimum. Every stage of the process is checked by hundreds of bacteriological tests to determine its efficacy. It is thus possible to ensure that all the bacteria have been killed, both in the interior and on the exterior of the catgut ligature. The manufacture and testing of surgical catgut was brought under the requirements of the *Therapeutic Substances Act*, and regulations governing sterile surgical catgut were enforced in 1930 and 1931. For sterility, tensile strength, gauge and the time specified for absorption, surgeons can rely upon London Hospital catgut, made in Great Britain under licence by the Ministry of Health. The Australasian agents are F. H. Faulding and Company, Limited.

A. M. BICKFORD AND SONS, LIMITED, 42, Currie Street, Adelaide, as a unit of the organization Drug Houses of Australia, exhibited surgical instruments and Merson's ligatures. The instruments shown included a comprehensive range of Stille's surgical instruments, this firm being

the sole agents for these instruments in South Australia. Of particular interest were the following items: Auto-wound clips, designed for use instead of sutures, made of stainless steel and arranged on galleries of one dozen. An adjustable Thomas splint was shown. As this splint is adjustable as to the size of the ring and also as to length, it is a useful splint to have available. It obviates the necessity for several splints to be carried. The portable model of Dr. Minnitt's apparatus for the self-administration of nitrous oxide was shown. This outfit is conveniently contained in a fibre case, having accommodation for two cylinders. The junior model of the Terry angle poise lamp was shown. It is adjustable in position and makes an excellent surgery examination lamp. A double transilluminator which was shown provided a general transilluminator and examination lamp, having two separate lamps attached to the one handle. The sinuses could be illuminated and the lamp could also be used for throat examination and for antrum transillumination.

The "Recumbent Spectacles" were shown. They have been devised to enable patients with spinal trouble, and others who have to lie in bed for long periods, to read with comfort from a book held on the chest. These spectacles may be worn over ordinary spectacles. The junior model of the Devine retractor was shown for the first time. It has the same sized frame as the standard model, but is not equipped with the sliding bar. It is complete with five blades. The standard model of this retractor was also shown. "Paragon" scalpel blades were shown. These blades are of English manufacture and are designed to fit the Bard Parker handle. The "Paragon" handles are also available.

An excellent display was arranged of Merson's catgut, and particular attention was given to Figure 14 catgut, obtainable in hundred-foot lengths. This catgut merely requires surface sterilization with Merson's "Iod-Aseptic" spirit and is ready for use in seven days. The standard sixty-inch tubes were also shown, also a new preparation, Merson's emergency sutures. These are contained in boxes of twelve, having four tubes of each of the following: silkworm gut, braided silk and catgut attached to a half-curved needle. This outfit is convenient to carry in the bag for emergency suturing.

A stand was arranged by DRUG HOUSES OF AUSTRALIA, LIMITED, which comprises houses situated in Adelaide, Brisbane, Perth, Melbourne and Sydney; the firm is represented in South Australia by A. M. Bickford and Sons, Limited, 42-46, Currie Street, Adelaide. Among the preparations shown were: "D.H.A. adrenalin hydrochloride solution" (1 in 1,000), a stable sterilized solution preserved from oxidation by saturation with carbonic acid gas; calcium gluconate tablets, each tablet containing twelve grains of calcium gluconate; "Dexsal", an effervescent preparation of dextrose (medicinal glucose) for the treatment of conditions involving acidosis, containing 34% pure medicinal dextrose; Elliott's ampoules, with the respective solutions, filled and hermetically sealed under expert laboratory supervision in special quality alkali-free glass ampoules; "D.H.A. hypodermic tablets", prepared from chemically pure salts, accurate in weight and rapidly and completely soluble to clear solutions; "Lubarol", a preparation containing 65% by volume of pure heavy mineral oil emulsified with agar, for the rational treatment of constipation, in conjunction with suitably controlled diet and exercise; "Nebuzol", a convenient preparation for affections of the throat and nose, particularly in the presence of irritation of the mucous membrane, and containing ephedrine, camphor, thymol, menthol and chlorbutol, dissolved in a high-grade white petroleum; "Plastine", a modern scientific poultice possessing all the virtues of the time-honoured poultice, but with the following advantages: longer retention of heat, absolute proximity to the skin, stimulating and antiseptic properties; "Proctol", a local anesthetic for the treatment by injection of anal fissures and pruritus, containing anæsthesin and benzyl alcohol in a sterile almond oil base; "D.H.A. syrup ammonium mandelate", a special preparation of the salt, flavoured to make it palatable, each two fluid drachms containing

50 grains of ammonium mandelate, this being equivalent to the full therapeutic dose of mandelic acid; "Trisil", a hydrated synthetic magnesium trisilicate of the highest quality. The manufacturers claim that "Trisil" differs from other antacid preparations owing to the vigour of its adsorbent action and the duration of its activity as a neutralizing agent, which enables a minimum of mineral base to control hyperchlorhydria continuously.

T. J. SMITH AND NEPHEW, LIMITED, of Hull, England, manufacturers of "Elastoplast" bandages and dressings and "Cellona" plaster bandages, represented in Australia by Drug Houses of Australia, Limited, and Messrs. A. M. Bickford and Sons, Limited, South Australian representatives, displayed their preparations.

"Elastoplast" elastic adhesive bandages were shown as an ideal dressing for a large number of surgical and orthopaedic purposes. It is claimed that "Elastoplast" elastic adhesive bandages possess the correct elasticity and adhesiveness and have achieved successes in the treatment of chronic leg ulcer and other disorders, such as impetigo, prurigo, shingles, acne, Bazin's disease, bed-sores *et cetera*; their use is also indicated in such conditions as arthritis, dermatitis, elephantiasis, foot deformities, fractures, hæmatoma, as post-operative dressings, in phlebitis and in varicose veins. They are supplied in various convenient widths, their unstretched length being three yards, stretching to five or six yards.

"Elastoplast" extension bandages are specially designed for extension work. Made to stretch crosswise instead of lengthwise, they give the necessary rigidity for reduction, whilst moulding comfortably to the contour of the knee, calf and ankle.

"Semiplast" bandages are similar to the "Elastoplast" bandages, but with the plaster spread over only half the width of the bandage. When they are applied spirally, only the first turn of the plaster comes in contact with the skin.

"Viscopaste" bandages, spread with the zinc oxide and gelatine mixture of the Unna's paste type, are a valuable adjunct to the treatment of leg ulcer with "Elastoplast" and to the after-treatment of fractures of the leg.

The "Elastoplast" surgery case of dressing strips was shown. This is a black metal case containing one each one and a half inches, two and a half inches and three inches by one yard "Elastoplast" dressing strips, consisting of a continuous pad of gauze medicated with bismuth subgallate 2% to 3% on the "Elastoplast" base. Dressings may be cut from the strips as required, and are suitable for small or large wounds, incisions *et cetera*. Tension may be applied to bring the edges of the wound together.

The "Elastoplast" doctor's set contains a large range of "Elastoplast" dressings of various sizes and types.

"Elastoplast" burn dressings and "Cellona" plaster of Paris bandages and slabs were also shown. "Cellona" bandages contain 90% plaster of Paris by weight incorporated in the cloth by an entirely new process.

ELI LILLY AND COMPANY, of Indianapolis, United States of America, through their Australian distributors, Messrs. Charles Markell and Company, Limited, of Sydney, displayed many preparations.

Besides the well-known products, such as "Insulin Amytal", "Sodium Amytal", ephedrine sulphate and "Parathormone", some newer products, such as "Bilron", "Ergotrate" tablets and ampoules, protamine zinc insulin, "Entoral" and "Seconal", were displayed for the first time in Australia.

Protamine zinc insulin has been developed as a result of cooperation with Dr. H. C. Hagerdorn and his associates, of Copenhagen, Denmark, and the University of Toronto. Protamine zinc insulin exerts a blood sugar lowering effect for a substantially longer time than does unmodified insulin. Each cubic centimetre contains 40 units of "Insulin Lilly" together with protamine and approximately 0.08 milligramme of zinc.

Bile acids and iron combine to form iron bile salts, which, because of their insolubility in acid media, will pass through the stomach into the intestine before dis-

integrating. "Biliron" (iron bile salts, Lilly) contains a high percentage of desoxycholic acid in such a combination. Because of its relative innocuous nature, adequate doses may be given without fear of undesirable side-effects, and constipation can be controlled without cathartic drugs.

"Entoral" is an immunizing agent, which, when given orally, is held to produce heterophile antibody in sufficient amounts to decrease materially the number of respiratory infections in many persons.

"Seconal" has definite uses in insomnia, nervousness, extreme fatigue with restlessness, and similar conditions. "Seconal" is effective for pre-anæsthetic medication when the purpose is to allay apprehension and induce sleep without materially affecting anaesthesia, except as an aid to its induction. It can be combined with the usual dose of morphine or morphine and atropine. In obstetrics "Seconal" can be used during the first stage of labour.

"Ergotrate" is a maleate of a new ergot base, and is indicated to limit *post partum* hæmorrhage and to accelerate uterine involution.

THE SOUTH AUSTRALIAN GOVERNMENT TOURIST BUREAU provided, throughout the entire period of the congress, an attractive display of photographic views of Adelaide beauty spots. In conjunction with this was a small lounge containing a writing bureau for the use of visitors, and an officer was in attendance to give any required information relating to the State and to arrange any travel reservations. Supplies of literature were freely distributed, and good use was made of the bureau's services by the visiting members of the congress, who appeared to appreciate the arrangements made on their behalf.

HAMILTON LABORATORIES LIMITED, 16, Pirie Street, Adelaide, displayed their own products and those of Francis Riddell Limited, of London, for which they are Australian agents.

The products of Francis Riddell Limited included the following: the "Pag Junior", "Dritax", "Jerrofan" inhalers; asthma preparations: "Sanabronchin", "Jerrofan" and "Asthmanan" solutions for use in the inhalers; "Resprosan" tablets for oral administration at the same time as the "Sanabronchin" inhalation is used, these products being held to ensure freedom from further attacks for several hours and to be prophylactic agents to prevent onset of attacks; "Anticalcolum", a preparation for use in gall-stones and inflammation of the biliary passages; "Adiposettes", for weight reduction; belladonna Exclud suppositories.

The Hamilton products displayed were: "Hamilton's calcium", an effervescent preparation of calcium gluconate with vitamins A and D; "Cardophyllin" tablets, myocardial stimulator, diuretic and coronary dilator for treating cardiac conditions; "Hæmatone", a pleasant-tasting, hæmoglobin-forming and nutritive tonic, containing ferrous iron; "Hamilton's halibut compound", a palatable tonic containing halibut liver oil, iron and malt; "Mustaplast", an efficient, non-blistering rubefacient; "Tropinal", for use in the treatment of migraine.

The exhibit of the GLAXO LABORATORIES LIMITED included a full range of their well-known vitamin preparations—"Ostodin" (vitamin D), "Adexolin" (vitamins A and D) and "Ostomalt"; two calcium and vitamin D preparations in "Ostocalcium tablets" (calcium sodium lactate with vitamin D) and "colloidal calcium with Ostelin", the only preparation of vitamin D for parenteral use.

"Syrup Minadex", a reconstructive tonic, and ferrous sulphate ("Fersolate") tablets were also given prominence.

Special features of the stand were the displays of "Farex", a reinforced, pre-cooked cereal food, and "Dissolved Vaccines G.L.", in which the bacterial cells were in solution and the total antigens were held to be immediately available for antibody production.

"Glucose D" (pure medicinal glucose with vitamin D) and a preparation of vitamin E ("Viteolin") completed the exhibition of this firm's pharmaceutical and food products.

Gas is now being used extensively in hospitals, for cooking, sterilizing, laundry and hot water requirements, and the efficient manner in which this can be carried out was amply demonstrated at the well-arranged display of the NATIONAL GAS ASSOCIATION OF AUSTRALIA. An item of particular interest was a pan sterilizer. This apparatus is well constructed, with chromium finish, and is made to fit into the wall with a gas-fired boiler at the back. The heating is automatically controlled, a feature in itself of considerable value.

Instrument sterilizers and pressure sterilizers for dressings also attracted attention. Individual steam units such as these showed that gas can be economically used for all the steam requirements of a modern hospital and that large unwieldy steam equipment can be dispensed with. Water still, bacteriological incubator and laboratory burners were also exhibited. In contrast with the purely technical exhibits other appliances showed how modern gas appliances contribute to the comfort of the home and surgery generally. A gas refrigerator demonstrated the silent, efficient method of refrigeration available. A special demonstration unit placed beside the stock model cabinet showed the ingenious system adopted to dispense with motors or any moving parts and still achieve perfect refrigeration. Various types of gas fires and small heating systems showed how simple, economical heating of rooms can be carried out. Several types of water heaters were included, the "Sagasco" sink heater earning special attention. This heater can be used over any sink or hand basin and has a special device to allow the immediate withdrawal of either scalding or lukewarm water.

The exhibit by the COMMONWEALTH INDUSTRIAL GASES LIMITED, Sydney, New South Wales, of a complete range of equipment for the administration of gas-oxygen anaesthesia, displayed numerous important advancements. A gas unit, incorporating a carbon dioxide absorber, from the Research Laboratories in Melbourne, created considerable interest and discussion among many practitioners engaged in gas-oxygen anaesthesia. The increasing demand by the medical profession for up-to-date equipment in both gas anaesthesia and oxygen therapy has led the Commonwealth Industrial Gases Limited, through its operating companies, to maintain a special medical department in each State to meet this demand. Apparatus for the administration of gas and oxygen has always been essential, and the "D.M." model "Austox" is held to embody all the essential factors which the surgeon must employ if he wishes to obtain and maintain satisfactory anaesthesia and analgesia.

The X ray division of PHILIPS LAMPS (AUSTRALASIA) LIMITED demonstrated an advance in X ray practice in the shape of the new rotating anode tube. A number of these have for some time been in use in Sydney, and are held to have proved the claims made for their high loadability and small focal spot.

The "Centralix" portable unit and the "Mobilix" were also given prominence, the latter, an English production with Philips components, being unique in the design of its tube-stand, which gives full travel and without counter-weight. Rectification was taken care of by an exhibit in section of the "Mercury Vapour H.T. Valve", the special feature being the small current consumption and extremely low voltage drop. "Centralix" portable units were found to be truly portable, weighing only thirty-eight pounds complete in one parcel and containing no oil or insulating and cooling, this purpose being served by an insulating material evolved in the Philips laboratories.

WATSON VICTOR LIMITED displayed an exhibit of X ray, electro-medical and scientific equipment, comprising the new rotating anode double focus Coolidge X ray tube designed to cover the entire field of diagnostic radiography.

The new deep therapy "Maximar" 200 Coolidge X ray tube, as used in the entirely deep deep therapy equipment which has revolutionized deep therapy apparatus, was one of the outstanding features of the exhibit.

The Watson urological table was also shown.

The entirely new "Portable G.E. Electrocardiograph" displayed is a compact light-weight unit designed to produce consistently heart records of full diagnostic value with ease and trouble-free operation.

The new "G.E. Inductotherm", which produces deep tissue heating by electro-magnetic induction, was also shown. Another feature of the exhibit was the new model "Hanovia Ultra-Violet Lamp" with the new type of electronic discharge tube.

A fine range of cystoscopes and laryngoscopes was displayed; also Bausch and Lomb ophthalmic instruments, including the ophthalmic operating lamp and binocular ophthalmoscope. Andrew Thom laboratory equipment was exhibited, including drying ovens, incubators, paraffin embedding ovens *et cetera*.

It was stated that Watson Victor Limited is established in all States and has trained engineers who are available for keeping all equipment in running order.

MUIB AND NEIL PROPRIETARY LIMITED, Sydney, Australasian agents for Oppenheimer, Son and Company Limited; Sanitas Company Limited, London; Cuxson, Gerrard and Company Limited, Oldbury, England; and Midgeley's Medicaments, drew particular attention to the pharmaceutical products of Messrs. Oppenheimer, Son and Company, including "Bipalatinoids" of iron and combinations whereby certainty of action was assured without the astringent and disturbing effects so often noted in iron medication.

Special attention was drawn to "Alphidine" (non-toxic iodine) and its various combinations, which have proved of value when ordinary iodine or iodides are unsuitable owing to idiosyncrasy to the standard preparations. "Alphidine" has been used with success in rheumatoid conditions, together with various combinations in which it is issued. It was stated that Oppenheimer, Son and Company Limited were essentially a straight-out British Pharmacopoeia Pharmaceutical House, and claimed that in the "Palatinoid" and "Bipalatinoid" method of medication rapidity of action and full therapeutic activity were fully secured.

In the display of "Sanoid" surgical ligatures it was emphasized that the name "Sanoid" indicated a dependable English catgut, the tensile strength of which was in excess of the recognized standard, and that it had a surface finish which ensured easy manipulation. "Sanoid" catgut was prepared and tested under Licence Number 40 of the *Therapeutic Substances Act* (Catgut) Regulations, 1930, of Great Britain. It was stated that "Sanoid" sterile catgut was supplied in hermetically sealed tubes containing triple sterilized gut in five-foot lengths; it possessed exceptional pliability, a silky surface and unusual tensile strength.

"Variban" elastic plaster bandage is made from specially woven material possessing very elastic properties and is impregnated with an antiseptic compound zinc oxide paste; it is self-adhesive and forms an even surface dressing, easy to apply and giving firm and even support to the limb.

KODAK (AUSTRALASIA) PROPRIETARY, LIMITED, made a comprehensive display of all the necessities for the X ray dark room. Foremost was the now famous "Kodak" duplitzed blue safety base X ray film. The "Kodak" stainless steel X ray, developing tank unit excited a deal of interest, being an addition to the range of Australian manufactured materials. Under this heading also came X ray cassettes, illuminators, radiographic stands, film trimmers, and a very fine example of a serial cassette tunnel for investigation of the duodenum. The quality and appearance of these items demonstrated the ability of "Kodak" Australian workmen to manufacture a precision X ray accessory which was held to compare more than favourably with the world's best in price and quality.

Photography in medicine has now assumed almost as great an importance as X ray examination and a complete range of recording media and apparatus was exhibited and demonstrated. Members during the congress used "Kodak" lantern slides, printing papers, or 16 millimetre Ciné film,

and these were projected by "Kodascopes" and epidiascopes. "Kodachrome" 16 millimetre Ciné film was extensively used and created interest by its faithful rendering of natural colour and its general excellence.

At the stand of PHARMACEUTICAL SPECIALITIES (MAY AND BAKER LIMITED) it was pointed out that in the twenty years that have passed since the introduction of "Novarsenobillon" May and Baker have steadily added to their list of medical specialties, which now number upwards of one hundred distinctive products. A comprehensive display of these, together with finer chemicals, was made. Among the preparations shown were "Proseptasine", p-benzylaminobenzenesulphonamide, the first colourless sulphonamide for streptococcal infections to be made available to the medical profession, and "Soluseptasine", disodium-p (γ phenylpropylamino) benzene-sulphonamide-α-γ-disulphonamide, the first colourless sulphonamide for intravenous or intramuscular injection. These are held to be indicated in severe cases of streptococcal infection when immediate presence of the streptococicidal drug in the blood stream is necessary. "Vinesthene" (vinyl ether) was demonstrated. The clinical work carried out with this inhalation anæsthetic during the last few years has proved its value when a short but profound narcosis is required. It is stated not to be uncomfortable or irritating to inhale, and the patient recovers quickly and without distress. "Arthrytin" (calcium-ortho-iodoxybenzoic acid) is administered in the form of its calcium salt and recommended in conditions in which there is defective peripheral circulation, particularly in leg ulcers and arthritis.

Other preparations of interest were: "Neo-Cardyl", "Novarsenobillon", "Soneryl", "Myocrisin", "Zephrol", "Planacrine", "Stovarsol Vaginal Compound", "Steilidin", "Acetylarsan", "Opacol", "Tryparsamide" and "Formadermine".

NESTLÉ AND ANGLO-SWISS CONDENSED MILK COMPANY (AUSTRALASIA) LIMITED arranged an attractive display of their products.

A new product, "Vitapan Pearls", is prepared from halibut and tunny liver oil. Each "Vitapan Pearl" contains the vitamins A and D equivalent of one and a half teaspoonfuls of best medicinal cod liver oil. This product is held to represent an advance on the older methods of vitamin therapy.

"Lactogen" and "Vi-Lactogen", well known in infant feeding, and Nestlé's malted milk were all well displayed. The last-mentioned is a concentrated form of nourishment especially suited to modern needs.

"Milo" tonic food, introduced to the local market three years ago, has, we are informed, won considerable praise as a palatable, health-giving beverage which contains milk and malt and is fortified with additional essential mineral salts and vitamins.

Leaflets, brochures, caloric tables, graphs and folders were available to explain in detail the products displayed.

PARKE, DAVIS AND COMPANY'S exhibit included first of all the endocrine group, "Antultrin-S", "Theelin in oil", "Pituitrin", "Pitocin" and "Pitressin". "Antultrin-S", a solution of the anterior pituitary-like hormone, has attracted attention from its successful use in maldescent of the testes, functional uterine bleeding *et cetera*. "Theelin in oil", a solution of the oestrogenic hormone, is used in menopausal conditions, amenorrhœa *et cetera*. Pitressin is administered for the prevention and treatment of post-operative abdominal distension.

Biological products included "Hemoplastin", scarlet fever streptococcus antitoxin, gas gangrene antitoxin, erysipelas streptococcus antitoxin, the new meningococcus antitoxin, and "Gonoderm" (gonococcus filtrate, Corbuser-Ferry) for the treatment of gonorrhœa.

In the vitamin products group were "Haliol", "Abidon" (vitamins A, B complex and D in a small capsule), "Irradol-A" (vitamins A, B₁, B₂, and D with iron and manganese in a palatable malt base), and "Viber" (vitamin B complex).

"Digifortis", a physiologically standardized solution prepared from digitalis grown on the firm's own farm, was accompanied by "Digifortis" capsules, tablets and ampoules, the last-named a fat-free solution for parenteral use.

Other new products noticed were "Mapharsen" (an arsenical of high efficiency and low incidence of reactions), "Glucio-Fedrin" (ephedrine in an isotonic aqueous dextrose base, readily miscible with nasal secretions), "Sulfanilamide" (for treatment of streptococcal infections), "Syrup mandelic acid" and the convenient "Chlorphenol red test solution", and "Ventron" ("Ventriculin" concentrate, iron sodium citrate and vitamin B in a small capsule).

ROCHE PRODUCTS LIMITED, London, apart from such well-known preparations as "Allonal", "Digalen", "Larostidin", "Omnopon", "Sedobrol" and the "Tubonic" emergency syringes, exhibited a wide range of medicines, many of which have only recently been evolved in their research laboratories and which were brought before the medical profession in Australia for the first time.

Amongst new preparations in which special interest was shown were "Apicur", a new bee-venom preparation for intracutaneous injections in rheumatic conditions; "Benerva", injectable synthetic vitamin B₁₂, each ampoule containing 1,000 international units, for the treatment of neuritic affections and *anorexia nervosa* (available also in tablet form, each tablet containing 500 international units); "Redoxon", synthetic l-ascorbic acid in tablet and ampoule form for disorders due to vitamin C deficiency, and found of value in the treatment of *diphtheria gravis*, hæmaturia, hæmorrhagic diathesis, *dermatitis herpetiformis*, dental malformation, correction of vitamin C deficiency in pneumonia *et cetera*; "Dichlorophenol-Indolphenol", indicator tablets for diagnosing vitamin C deficiency by examination of the urine; "Prostigmin" physostigmine analogue, an injectable peristaltic stimulant for the treatment of paralytic ileus and post-operative retention of urine (ampoule form) and a specific in *myasthenia gravis* (ampoule solution, tablets); "Naligan", sea-air-travel-sickness remedy, a combined antispasmodic and sedative containing "Syntropan"; "Estroglandol" ointment, the ætrus-producing hormone for percutaneous application in *pruritus vulvæ* and *acne vulgaris*.

EVANS SONS LESCHER AND WERN LIMITED, Liverpool, England, exhibited a wide range of this British firm's products. Chief amongst them were: "Colliron Evans", an ideal form of iron for massive dosage. One teaspoonful contains six grains of iron, which is equivalent to twelve Bland's pills. It is palatable, does not discolour the teeth and does not upset the digestion. "Streptocide Evans" (p-aminobenzenesulphonamide), indicated in acute puerperal sepsis, erysipelas, tonsillitis and other infections due to hæmolytic streptococci. "Novasorb Evans", a synthetic magnesium trisilicate, for the treatment of hyperacidity of the stomach and peptic ulcers without risk of toxic alkalosis. "Neo Hepatex Evans", for intramuscular or intravenous use in macrocytic anemias. This fraction of liver extract, being remarkably active and free from protein, may be given intravenously with safety. "Hepatex Oral Evans", a potent extract of mammalian liver, prepared by a process which ensures a high proportion of the hæmopoietic factor and of the vitamin B complex. "Hepatex" is held by the makers to be the most concentrated extract available for oral administration; it is also held to be palatable and easily assimilated. The therapeutic equivalent of two ounces of fresh liver is contained in a teaspoonful dose. "Zant Evans" is a saponified combination of para-chlor-meta-xyleneol having a coefficient of six as compared with carbolic acid.

RECKITT'S (OVER SEA) LIMITED, Pharmaceutical Department, Sydney, exhibited "Dettol", a halogen derivative of xyleneol, is non-poisonous and non-staining. It has an agreeable smell and is an excellent deodorant. "Dettol" is harmless to normal skins, its bland properties enabling it to be used at really effective strengths. Tests by independent investigators at three well-known London hospitals have shown that the Rideal-Walker coefficient of

3.0 is well maintained in the presence of blood, pus, faeces and other organic matter. In addition it has been demonstrated that skin treated with "Dettol" in high concentrations remains insusceptible to infection by hæmolytic streptococci for several hours. "Dettol" is miscible with water in all proportions. "Dettol" obstetric cream contains 30% "Dettol" in gum tragacanth and is intended for midwifery purposes only.

Reference was made to a test carried out during the past year in connexion with the incidence of sepsis in childbirth in the Rhondda urban district, south Wales. The figures obtained for 1935 are shown below. It will be noted that for cases in which "Dettol" was the antiseptic used, the incidence was only 10.6 per thousand confinements, as compared with 30.4 per thousand where other disinfectants were employed.

Disinfectants Used.	Number of Midwives.	Number of Confinements Attended.	Incidence of Septic Cases per 1,000 Confinements.	Death Rate from Sepsis per 1,000 Confinements.
"Dettol"	54	1,598	10.6	2.5
Others ...	15	395	30.4	5.1

These figures are taken from a report which has been submitted to the British Ministry of Health by the National Birthday Trust Fund.

ABBOTT LABORATORIES LIMITED displayed their products: "Nembutal", "Pentothal Sodium", "Metaphen" and "Glucophylline". Stress was laid on the research undertaken by the organization and on the fact that no Abbott product intended for the cure and alleviation of disease was advertised to the laity. Complimentary copies of the *Journal of Chemotherapy and Advanced Therapeutics* were distributed among members.

BAYER PHARMA LIMITED, Sydney, exhibited a comprehensive and interesting range of pharmaceuticals prepared at the Bayer laboratories. This exhibit included recently introduced pharmaceutical preparations as well as the better known products, such as: "Prontosil" (for the treatment of streptococcal infections); "Betaxan" (a synthetic preparation of vitamin B₁₂); "Cantan" (a preparation of vitamin C); "Detavit" (vitamin D and A product); "Torantil" (for treatment of allergic diseases); "Devegan" (vaginal tablets for leucorrhœa); "Esmodil" (a vagal stimulator for the treatment of post-operative intestinal paralysis); "Bioferol" (tonic and blood-forming preparation); "Mesodine" (acridine preparation for gonorrhœa in the female); "Per-Abrodil Forte" (a new 50% solution of "Per-Abrodil" for intravenous pyelography); "Protheonal" (a compound for the symptomatic treatment of hypertension); "Campolon" (for pernicious anemia, administered intramuscularly); "Prolan" (anterior pituitary); "Unden" (ovarian hormone preparation); "Butolan" (anthelmintic); "Lacarnol" (*angina pectoris*); "Salvarsan" (Ehrlich's original "606"); "Neo-Salvarsan" (Ehrlich's original "914"); "Phanodorm" (hypnotic); "Evipan" (somniafacient, extremely rapidly detoxicated); "Evipan sodium" (for short anesthesia intravenously administered); "Icoral" (analeptic for cardiac and respiratory failure); "Decicain" (local anæsthetic); "Luminal" (the original phenyl-ethyl-malonyl-urea); "Novocain" (local anæsthetic); "Festan" (pancreatic enzyme); "Elityran" (standardized extract of natural thyroid); "Prominal" (anti-epileptic exhibiting typical "Luminal" action with reduced hypnotic effect); "Theominal" (high blood pressure); "Zephiran" (a new, completely non-irritant and highly effective disinfectant, useful for the disinfection of the hands and instruments).

ALFRED LAWRENCE AND COMPANY LIMITED brought to the notice of members "Poulticine", an improved *cataplasma kaolin* manufactured at their plant situated at Kensington (Victoria), where there are complete analytical laboratories for the supervising of all stages of manufacture. One of

the outstanding characteristics of this product is its property of retaining heat for very long periods, which is very essential whenever thermotherapeutic treatment is indicated, to combat the infective progress or as an adjuvant to the normal treatment of pneumonias. "Poulticine" is compounded from a specific formula which obviates the danger of skin irritation likely to be caused by similar applications containing methyl salicylate. It is antiseptic, possesses osmotic, hygroscopic and bacteriostatic properties which hasten resolution of the inflammatory process, and is manufactured and packed by an entirely mechanized and hygienic process which precludes all possibility of contamination. It was pointed out that "Poulticine" was the only poultice of its kind listed under "Chemists Only" contract with the Federated Pharmaceutical Service Guild of Australia, being sold only through pharmacists. "Poulticine" comes to the physician packed in hermetically sealed canisters, and in four convenient sizes of half pound, one pound, two pounds and five pounds (hospital size).

CHARTRES LIMITED had a display of modern office equipment. Interest was taken in the medical keyboard portable typewriter, and in the card-filing and lodge record systems by "Kardex". The "Chartres Posture Chair", a chair designed on the advice of anatomists, proved an attraction. Remington Noiseless typewriters offered writing perfection with silence; it was pointed out that they would be valuable to the professional man whose office work is done at his consulting rooms.

F. W. BOWKER AND COMPANY, of Melbourne, Sydney and Adelaide, showed some new and interesting electro-medical equipment.

The "Cold Quartz Ultra-Violet Apparatus" was shown. This apparatus gives a true ultra-violet radiation, the source of which differs radically from other types of generator employing water-cooled and tilting burners. The claims made for this apparatus are supported by clinical research, and the Council of Physical Therapy of the American Medical Association has extended its acceptance to genuine "Cold Quartz". Its advantages include: (i) operation at low temperature, (ii) constant output, (iii) indefinite life with practically no deterioration, (iv) equal side and end emission from official electrodes, (v) direct starting with automatic timer control.

The "King Thermanester" was demonstrated. This is a new device for the administration of ether in anaesthesia. It is of small size and is simple in action. Its use offers many advantages over the open drop method, including absence of after-effects, such as nausea and vomiting, prevention of accidental introduction of raw ether, lessening of fire risk (as the ether is entirely enclosed) and considerable saving in quantity of ether used.

The "F. W. Bowker Portable Short Wave Unit" was also demonstrated. It has a large output, sufficient for all ordinary treatments, and employs a safe form of inductor cable in addition to the flat pad electrodes. Recently introduced, a special short wave surgical model, also portable, was on view.

The low intensity treatment apparatus of Dr. Weissenberg, for which F. W. Bowker and Company hold the sole Australian manufacturing rights, was exhibited for the first time in this country. This unit employs ultra-short wave radiation without heat, and is proving successful overseas, particularly in the treatment of nervous disorders.

THE BOWKER X-RAY COMPANY PROPRIETARY, LIMITED, of Melbourne and Sydney, displayed X ray apparatus and accessories, both manufactured by the firm and imported from overseas. The "Bowker Universal X-Ray Table and Generator" was demonstrated. This apparatus will permit radiography up to four feet vertically and six feet horizontally, screening with the patient in the prone and upright positions, examination with the Bucky diaphragm at any height, synchronous movement of the tube and screen, and synchronous movement of the tube and the

Bucky diaphragm. Other exhibits included an apparatus invented by the *Compagnie Générale de Radiologie*, of Paris, for making fluoroscopic examinations without the necessity for darkening the room, a daylight developing unit, a shockproof mobile X ray unit and short wave therapy units. A book by Mr. John Bowker, entitled "X-Ray Apparatus and Technique", was also shown.

BUTTERWORTH AND COMPANY (AUSTRALIA) LIMITED, of 8, O'Connell Street, Sydney, had on view "The British Encyclopedia of Medical Practice", a work which has been published under the editorship of Sir Humphry Rolleston.

The "BOTH" ELECTROCARDIOGRAPHIC APPARATUS, designed in Adelaide by Mr. E. T. Both in association with the Physics Department of the University of Adelaide, was demonstrated. This was described as a compact lightweight unit which could be taken to the bedside of the patient and from which the permanent record could be read without delay.

THE COMMONWEALTH SERUM LABORATORIES displayed a wide range of biological products, which included sera, antitoxic and antibacterial; vaccines for administration by various routes; endocrine substances, such as insulin, pituitary extract and thyroid extract; diagnostic agents for clinical and laboratory use; prophylactic agents, such as diphtheria toxoid (anatoxin); extracts for the diagnosis and treatment of allergic conditions, such as hay fever and asthma; and biological products for veterinary use. It was pointed out that "Commonwealth" products are standardized in accordance with the standards prescribed by the British regulations under the authority of the *Therapeutic Substances Act* of Great Britain, and that these are in agreement with the standards of the League of Nations.

R. L. SMITH AND COMPANY, surgical engineers, of Adelaide, had a display of modern operating theatre equipment.

G. F. CLELAND AND SONS, LIMITED, of Adelaide, had a display of "Chateau Beaumont Brandy".

FRANK N. KAVANAGH displayed "Vim" hypodermic syringes.

British Medical Association News.

SCHOLARSHIPS AND GRANTS.

DR. T. A'B. TRAVERS, of Melbourne, has been awarded a research scholarship by the Science Committee of the British Medical Association, London, for the year commencing October 1, 1937.

The subject of the proposed investigation is: (i) The manner in which suppression of vision occurs in squint. (ii) Abnormal retinal correspondence in squint, with particular reference to the association of suppression of vision and abnormal correspondence. This is a continuation of the scholarship held at present by Dr. Travers.

NOMINATIONS AND ELECTIONS.

THE undermentioned have applied for election as members of the Tasmanian Branch of the British Medical Association:

James, Trevor Claude, M.B., B.S., 1925 (Univ. Melbourne), Queenstown.

Klansen, Fanny Croaker Robertson, M.B., Ch.M., 1926 (Univ. Sydney), Swansea.

BRITISH MEDICAL AGENCY OF NEW SOUTH WALES LIMITED.

THE annual ordinary general meeting of members of the British Medical Agency of New South Wales Limited was held in the William Henry Crago Council Room, British Medical Association House, 135, Macquarie Street, Sydney, on October 5, 1937, Dr. R. B. Wade in the chair.

In presenting the report of the directors on the business of the agency for the year ended June 30, 1937, the chairman expressed the satisfaction of the board with the steady progress which had been made during the year under review. A detailed report, which disclosed a total income of £2,152, was made available to all members present at the meeting, and fluctuations of income received from various sources were explained. The auditors' report was also received. The chairman drew attention to the difficulties which were experienced in securing suitable men to do *locum tenens* work, and reported with regret that at some periods of the year it had been necessary to advise clients that no suitable men were available for this work. A large number of young graduates were engaged in further study in England, and others were absent in Queensland, where the demand for young men willing to undertake *locum tenens* work seemed to be increasing each year. It was hoped, however, that this situation would be relieved early in the new year.

The income received from insurances of all kinds showed an increase over the previous year of £200. The British Medical Association (New South Wales Branch) Superannuation Fund had gained seventy-one new members, so that the total membership was over four hundred, with a capital fund of over £300,000. The sickness and accident section of the fund had proved its worth to a large number of those members who had made claims for sickness or accidents, and the underwriting company had settled all claims very promptly and fairly. The chairman strongly urged all members of the British Medical Association (New South Wales Branch) to make inquiries of the agency staff before increasing their life assurance cover or negotiating or altering any of their existing policies at the instigation of life assurance agents.

The commission received from sales of practices was considerably less than in the previous year, but great hopes were entertained for better results in the future, owing to the formation and operation of Medical Finance Limited. The chairman was confident that the profits of the agency would increase considerably as a result of these arrangements for financial assistance in the transfers of practices and partnerships.

In conclusion, Dr. Wade expressed the thanks of the directors to those members who had so loyally patronized the agency in all its activities, and asked for a continuance of that support.

The retiring directors, Dr. R. B. Wade, Dr. F. Brown Craig, Dr. A. M. Davidson and Dr. George Bell, were duly elected directors for the ensuing year.

MEDICAL FINANCE LIMITED.

THE statutory meeting of members of Medical Finance Limited was held in the William Henry Crago Council Room, British Medical Association House, 135, Macquarie Street, Sydney, on October 5, 1937, Dr. R. B. Wade in the chair.

The chairman explained the constitution and objects of the company and expressed his pleasure at the manner in which medical men in this State had responded to the circular sent out by the British Medical Association (New South Wales Branch). Flotation of the company had proceeded without any hitch occurring, and registration was effected on July 21, 1937, since which date five applications for loans had been received from medical men, all of which had been granted. He felt that the establishment of this company provided a long-felt want in the profession.

Control of the company's funds was in the hands of the board, which consisted entirely of medical men, who had power to coopt expert financial advisers from the staff of the Bank of New South Wales, if necessary, in any particular case. The whole of the share capital allotted was held by medical men, who were not required, as yet, to pay any money in respect thereof. In fact, it was hoped that no calls of any kind would be necessary.

Dr. Wade said that the establishment of Medical Finance Limited would not only assist individual doctors who desired to buy or sell practices, but also assist the British Medical Agency of New South Wales Limited, through which company all transfers would be made. It was the intention of the directors to build up a reserve fund in the agency's accounts, in order to provide for the contingency of possible losses in the business of Medical Finance Limited.

Two of the five directors, Dr. George Bell and Dr. Lindsay Dey, retired in accordance with the Articles of Association and were duly reelected.

Medical Societies.

THE MEDICAL EYE SERVICE OF VICTORIA.

THE second annual meeting of the Medical Eye Service of Victoria was held at Morris House, 120, Exhibition Street, Melbourne, on Wednesday, September 1, 1937.

The Council of Management reported a very satisfactory attendance of patients during the first year.

The following members were elected to the Council of Management:

President: Sir James Barrett.

Representative of the Council of the Victorian Branch of the British Medical Association: Dr. Mark Gardner.

Councillors: Dr. Stuart Fraser, Dr. T. A. Beckett Travers, and Dr. Z. Schwartz.

Correspondence.

IMPRESSIONS OF A SHIP'S SURGEON, 1848.

SIR: Dr. Keith Macarthur Brown's article, "Impressions of a Ship's Surgeon, 1848" (THE MEDICAL JOURNAL OF AUSTRALIA, October 9, 1937) was refreshing and informative from a viewpoint of medical history of a nation about to celebrate its sesqui-centenary celebrations.

One notes that the ship *Royal George* sailed so far west that Dr. Hort Brown sighted Trinidad, and expressed regret that the passengers could not go for a stroll ashore. They were lucky. I think this would not be the British West Indies Trinidad of pitch lake fame, but probably Trinidad, a small islet, about two miles long by one mile wide, situated latitude 23° 30' south, longitude 29° 22' west, about 650 miles in the Atlantic off the coast of Brazil. It was visited in 1700 A.D. by Dr. Halley (astronomer royal) and is a breeding base for ferocious Atlantic sea-birds and countless loathsome land crabs. Its highest mountain peak is 3,000 feet high, visible about forty miles. Mr. E. F. Knight, in his treasure-hunting yacht *Alerte* in 1839, had extreme difficulty in landing, and discovered only one route across the island that a strong man could negotiate.

For a sailing ship outward bound England to Australia via Good Hope the *Royal George* would appear to have gone further west than was desired. In the golden days of sail ships returning to England from Australia via the Horn hoped to sight this island, the known longitude of which enabled them to correct their chronometers. How different in these days of radio time signals! Dr. Hort Brown's diary mentions a confinement at sea. One wonders what was the mortality rate of sailing-ship accouchements. It would be interesting to know if

that child be still alive. I know one dear old gentleman still alive in Sydney who was born five years later, in 1853, running before the "Brave West Winds" well south of Good Hope in the 880-ton Moncton-built full-rigged ship *David Molver*. The oft-heard expression is "wooden ships and iron men". May I suggest that Bluenose Novascotian-built meant "soft wood ships and diamond men". Is any Britisher alive who has been born further south? Has anyone who arrived "in sail" been longer in Australia? It is recorded that a Bluenose captain's wife was confined whilst the ship was hove-to in a gale south of the Horn en route Frisco to Halifax.

One can only think that with pioneers like these women and men, who, after convict transportation ceased in 1850, voluntarily left the United Kingdom, Australia could not help being peopled by a virile race! May one suggest that Dr. Keith Brown be generous enough to lend Dr. Hort Brown's diary to the Mitchell Library. Possibly members of the Medical History Section, which, I am told, is a live body, could use it. In the sesqui-centenary celebrations it is to be hoped that the spade work of seagoing medical men in the early establishment of the Australian nation will not be overlooked!

Yours, etc.,

KEVIN BYRNE.

Lakemba Cottage,
Lakemba,
New South Wales.
October 18, 1937.

MALARIA AND ITS TREATMENT BY THE GENERAL PRACTITIONER.

SIR: I regret that Dr. Finckh has seen fit to read into my letter of August 5 meanings which I did not intend. I have not read Dr. Nocht's book, and even were I in a position to criticize him and his colleagues, I certainly would not presume to label them a "parcel of fools".

Dr. Finckh made many sweeping statements in his original article, culminating in one: "It is therefore easy to understand that 'Plasmoquine' . . . and 'Atebrin' . . . have displaced quinine". In practice this is not correct, and I submit in all humility that if my experience of over 1,000 cases leads me to conclude that quinine is still the safest and most certain drug for use against malaria in routine treatment in the field, the recording of such an opinion is not without value.

Also, even if we, losing sight of the truly international nature of our profession, become parochial, I nevertheless fail to understand why an Australian should be rebuked for preferring Dutch quinine to German "Atebrin", since his own country produces neither. As a matter of fact, I procure my quinine from the Australian branch of an American firm, and I neither know nor care where it comes from originally, but if the Dutch Bureau, by presenting the case for quinine where hitherto the monopoly of commercial propaganda has been held by the other side, can persuade people that there are two sides to the question after all, then it has my whole-hearted approval.

Yours, etc.,

CARL GUNTHER.

Bulolo,
Territory of New Guinea,
September 29, 1937.

Obituary.

RUDOLPH HERBERT SCHLINK.

DR. RUDOLPH HERBERT SCHLINK, whose death occurred recently at Albury, was for over forty years one of the most widely known and respected medical practitioners in southern New South Wales and northern Victoria. He was the son of the late Albert Schlink, who settled in the Wodonga district of Victoria in 1863. He received his early education in Albury and later went to Saint Patrick's

College, Goulburn. He studied medicine in Germany, where he came under the influence of Virchow. He received the degree of Doctor of Medicine of the University of Berlin in 1892. He practised for over thirty years in Wodonga, Victoria, and in 1925 moved to Albury, where he practised until his retirement shortly before his death. He was a brother of Dr. H. H. Schlink, of Sydney, to whom the sympathy of the medical profession is extended.

Dr. J. Noel Brown, of Albury, writes:

There passed away on Friday, September 24, at Albury, from coronary disease, Dr. Rudolph Herbert Schlink, aged only sixty-nine, after more than a year's precarious health.

As one who had intimate association with him for eight years, I would like to mark his passing with some sincere comment. On both sides of the Murray, including a wide radius particularly in Victoria, countless people whom he has faithfully served for forty years mourn his demise. He represented one of the old school of physicians rapidly passing from our scenes. I think I have personally never met a man of more utter integrity in every way. His code of medical ethics was the highest possible. The welfare of his patients was the paramount affair always. Cautious to an almost extreme degree in prognosis and consultative capacities, there was something intangible about him that encouraged confidence and trust in every possible way.

Some medical men are respected or even feared, whilst at the same time they are trusted. Dr. Schlink was a man who caused a reaction of all these things in his patients, but paramountly more was his innate capacity to arouse the feeling in his patients, associates and friends of the greatest emotion, and that was of love and affection.

He was an M.D., Berlin, and, as was common during the War, had to bear a great deal of ill-weighed calumny, which he bore like the man he was. He had a magnificent leonine head and profile, and I have yet to look upon a finer face and head, even in death—a physiognomy that portrayed breeding, intelligence and character to its highest degree. He was quietly rebellious to his enforced idleness. Contemporary friends, like Dr. Konrad Hiller and Dr. Murray Morton, urged him to retire. He took their advice and laughingly thought they were alarmists, but we who were in close contact with him felt that in his heart he knew what was ahead of him.

He died suddenly, as we all wished he would. He would have hated long hospitalization and invalidism. Unique, I think, was the fact that six local practitioners felt honoured to carry his casket in the funeral ceremonies. An honoured and loved personality has left the Riverina mourning.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE Joint Honorary Secretaries of the fifth session of the Australasian Medical Congress (British Medical Association) wish to announce that members of the Branches who attended the congress and who were included in the official photograph may obtain a copy on application to 178, North Terrace, Adelaide. Applications should be addressed to the Joint Honorary Secretaries. The price per copy will be ten shillings; and this will include packing and postage.

Corrigendum.

WE have been informed that an error has occurred in the issue of October 16, at page 667, line 24. At the meeting of the Section of Oto-Rhino-Laryngology and the Section of Radiology and Electrical Therapy at the Adelaide Congress part of Dr. R. McM. Glynn's remarks were reported as follows: "He referred to a patient who had been treated

by Dr. Verco for six months by irradiation; the patient had had severe reactions and he preferred intubation to irradiation." This should read: "He referred to one patient treated by Dr. Verco who had lived for sixteen months after irradiation." At a later stage Dr. Glynn referred to the fact that some of his patients had had severe reactions after irradiation.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as duly qualified medical practitioners:

Hambrett, Hugh William Stafford, M.B., B.S., 1933 (Univ. Sydney), Cairns.
Spence, Olaf McClure, M.B., 1936 (Univ. Sydney), Clermont.

Books Received.

HEART FAILURE, by A. M. Fishberg, M.D.; 1937. Philadelphia: Lea and Febiger; Australia: Angus and Robertson Limited. Medium 8vo, pp. 788, with 25 engravings. Price: 50s. net.

Diary for the Month.

- Nov. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- Nov. 2.—Tasmanian Branch, B.M.A.: Council.
- Nov. 3.—Western Australian Branch, B.M.A.: Council.
- Nov. 4.—South Australian Branch, B.M.A.: Council.
- Nov. 5.—Queensland Branch, B.M.A.: Branch.
- Nov. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- Nov. 9.—Tasmanian Branch, B.M.A.: Branch.
- Nov. 10.—Victorian Branch, B.M.A.: Branch.
- Nov. 12.—Queensland Branch, B.M.A.: Council.
- Nov. 16.—New South Wales Branch, B.M.A.: Ethics Committee.
- Nov. 16.—Tasmanian Branch, B.M.A.: Council.
- Nov. 17.—Western Australian Branch, B.M.A.: Branch.
- Nov. 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
- Nov. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- Nov. 24.—Victorian Branch, B.M.A.: Council.
- Nov. 25.—New South Wales Branch, B.M.A.: Branch.
- Nov. 25.—South Australian Branch, B.M.A.: Branch.
- Nov. 26.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xiii to xxiv.

- AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Resident Medical Officer.
- BALLARAT AND DISTRICT BASE HOSPITAL, BALLARAT, VICTORIA: Resident Medical Officers.
- CAIRNS HOSPITALS BOARD, CAIRNS, QUEENSLAND: Medical Superintendent.
- CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
- DIRECTOR-GENERAL OF HEALTH, SYDNEY, NEW SOUTH WALES: Visiting Medical Officer, Honorary Physician.
- FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Medical Officer.
- HOBART GENERAL HOSPITAL, HOBART, TASMANIA: Resident Medical Officers.
- KANEMATSU MEMORIAL INSTITUTE, SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Senior Pathologist.
- ROYAL AUSTRALIAN NAVY: Medical and Dental Officers.
- TAMWORTH BASE HOSPITAL, TAMWORTH, NEW SOUTH WALES: Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
ASHFIELD AND DISTRICT UNITED FRIENDLY SOCIETIES' DISPENSARY. BALMAIN UNITED FRIENDLY SOCIETIES' DISPENSARY. LEIGHARDT AND PETERSHAM UNITED FRIENDLY SOCIETIES' DISPENSARY. MANCHESTER UNITY MEDICAL AND DISPENSING INSTITUTE, OXFORD STREET, SYDNEY. NORTH SYDNEY FRIENDLY SOCIETIES' DISPENSARY LIMITED. PEOPLE'S PRUDENTIAL ASSURANCE COMPANY LIMITED. PHENIX MUTUAL PROVIDENT SOCIETY.	
NEW SOUTH WALES: Honorary Secretary, 135 Macquarie Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Prosperpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178 North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

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